Vol. XX. Part 12.

[Registered at the General Post Office, Melbourne, for transmission by Post as a Newspaper.]

3.1.23.

The Journal of the Department of Agriculture of Victoria, Australia.

December, 1922.

PRINCIPAL CONTENTS

Dairy Farming

Geelong Farm Competition

Passion Fruit Culture

PRICE THREEPENCE. (Annua Subscription—Victoria, Inter-State, and N.Z., 3/-; British and Foreign, 5/-.

Brunning's Genuine "GARAWI"

SUDAN GRASS

Samples and Prices on application

Is Specially Tested and Machine Dressed

The Genuine "Garawi" Sudan Grass can be pastured, cut green, or made into hay or ensilage. Yields up to 8 TONS PER ACRE. And is an insurance against drought, as it thrives under dry conditions where other plants WILL NOT LIVE.

JAPANESE MILLET

Comes in early, and can be fed off from 5 to 6 weeks after seeding. Makes first-class green feed, hay, and ensilage, of which two cuttings can be obtained in a season.

SWEET CLOVER

(Melilotus Alba)

UNEQUALLED FOR RESTORING WORN-OUT LAND

Sweet or Bokhara Clover is the greatest soil-improving plant ever introduced. Unequalled for restoring worn-out land, adds Humus and Nitrogen to the soil, and is absolutely drought-resistant. Can be pastured, cut for green feed, or made into hay; makes first-class ensilage, and is unexcelled for early Spring Fodder.

Special Booklets on Sweet Clover and Sudan Grass free on application.

BRUNNINGS

F. H. BRUNNING Pty. Ltd.

64 ELIZABETH STREET, MELBOURNE

NATIONAL MUSEUM MELBOURNE

THE JOURNAL

OF

THE DEPARTMENT OF AGRICULTURE,

VICTORIA, AUSTRALIA.

CONTENTS.—DECEMBER, 1922.

		PAGE
Dairy Farming (continued)	*R. T. Archer*	705
Standard Herd Test—Report, September Quarter, 1922		723
Geelong Farm Competition—Report of Judge ...	*H. A. Mullett, B.Ag.Sc.*	739
Passion Fruit Culture in Victoria	*J. Farrell*	762

COPYRIGHT PROVISIONS AND SUBSCRIPTION RATES.

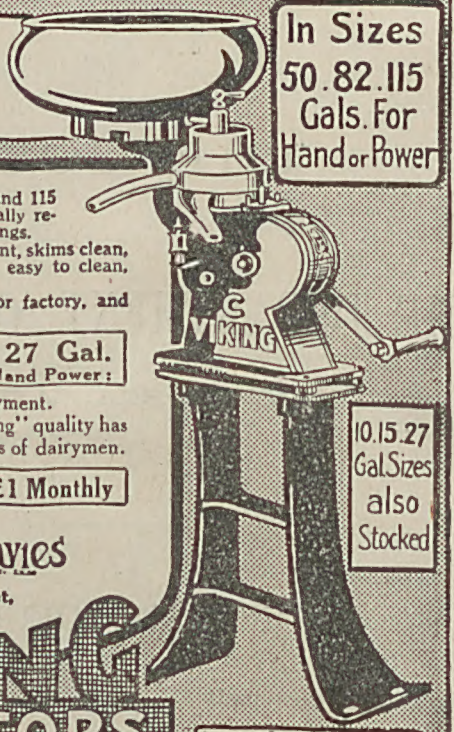
The Articles in the Journal of the Department of Agriculture of Victoria are protected by the provisions of the Copyright Act. Proprietors of newspapers wishing to republish any matter are at liberty to do so, *provided the Journal and author are both acknowledged.*

The Journal is issued monthly. The subscription, which is payable in advance and includes postage, is 3s. per annum for the Commonwealth and New Zealand, and 5s. for the United Kingdom and Foreign Countries. Single copy, Threepence.

Subscriptions should be forwarded to the Director of Agriculture, Melbourne. A complete list of the various publications issued by the Department of Agriculture will be supplied by the latter.

Big Machines At Small Prices

In Sizes 50. 82. 115 Gals. For Hand or Power



Large dairymen buy now. 50, 82 and 115 Gal. For Hand or Power. Specially recommended. Prices show fine savings.
The "Viking" is wonderfully efficient, skims clean, and runs easily. Improved bowl, easy to clean, strong and rigid frame.
Made by world's largest Separator factory, and backed by 25 years' reputation.

Big Stocks 10, 15, 27 Gal.
: Easy Running Machines for Hand Power :

Old Separators taken in part payment.
Satisfaction guaranteed. "Viking" quality has been acknowledged by thousands of dairymen.

Terms : From £1 Down, £1 Monthly

10.15.27 Gal Sizes also Stocked

Langwill Bros & Davies
110-114 Sturt Street, South Melbourne.

VIKING SEPARATORS

DO YOU NEED A WINDMILL?

Provided the Mill you install is an **"ALSTON"** you are assured of ample supplies of water.

The "ALSTON" Enclosed Double-Geared Self-Oiling Windmills

Represent the most improved type in Windmill construction.

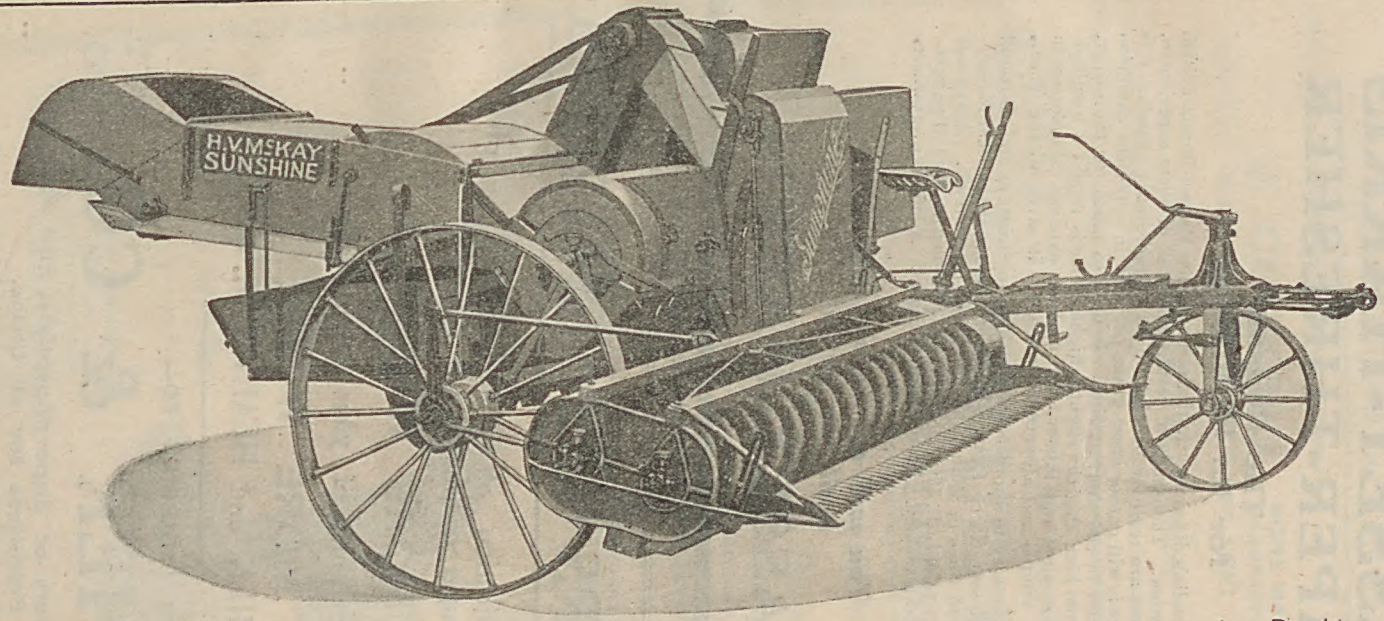
Fitted with all machine-cut Gears, you are assured, not only of quiet running, but of much longer and better service than can be obtained with ordinary cast pinions and gear wheels. The teeth mesh evenly, and will last for an indefinite period.

This is only one of the many BETTER points of the "ALSTON" Windmill. Superior strength of tower, the adjustable speed regulator, and steel ball-bearing turntable are other features that deserve your consideration.

Don't decide on YOUR plant without inquiring about the "ALSTON." It will pay you.

Free Illustrated Catalogue and Price List will be postea on receipt of your application.

JAMES ALSTON & SONS PTY. LTD.
Queen's Bridge, Melbourne, Australia



The Sunshine Header Harvester or Reaper Thresher, as depicted above, is used at the Dookie Agricultural College, the Longerenong Agricultural College, the State Research Farm, Werribee, and also at the Government Experimental Farm, Bomen, N.S.W. It was invented and is manufactured in Australia. It harvests wheat, oats, or barley, and recovers the maximum percentage of the grain whether the crops are standing, fallen, or weed-infested.

MASSEY-HARRIS
REAPER-THRESHER

The Reason for Its Popularity

Over 7,000 of Australia's discriminating farmers use the Massey-Harris British Built Reaper-Thresher. Thousands of testimonials tell of their experiences, which in many cases are really wonderful. This extraordinary popularity is due to the fact that it will gather more grain per acre in a perfect condition at the least cost and in the shortest time. It does so much for the owner, requires so little from him, that the slightly higher price is repaid a hundred-fold in the saving of time and labour, low up-keep expense, simpleness in operation, perfect sample and absence of waste, for it saves all the wheat.

Inspection is necessary to appreciate fully the many features and all-round superiority of the Massey-Harris Reaper-Thresher. See it at the local Massey-Harris Agency or call when in Melbourne and judge for yourself. A request sent to Massey-Harris Co. Ltd., 570-576 Bourke-st., Melbourne, for full particulars will be answered promptly. Branches in all States. Agencies everywhere.

You will not be satisfied until you get a

British Built **MASSEY-HARRIS**

FARMERS and GRAZIERS

The application of a heavier dressing of Superphosphate will produce

MORE WHEAT.

The top-dressing of your pasture means

MORE WOOL,

MORE MILK, and HEALTHIER STOCK.

ADDRESS YOUR INQUIRIES TO—

WISCHER & CO. PTY. LTD.

Manufacturers of Superphosphate, and Special Fertilizers for all Crops.

OFFICES:
153 William St., MELBOURNE.

WORKS:
Whitehall St., YARRAVILLE.

HIGH-GRADE BONE MANURE

MEAT MEAL FOR POULTRY FILLS THE EGG BASKET

Delivered at Railway Station, Footscray, or on Wharf, Melbourne

J. COCKBILL, BONE MANURE MANUFACTURER

OFFICE—407 POST OFFICE PLACE, MELBOURNE

BONES BOUGHT. CONSIGN TO ME, FOOTSCRAY. TELEPHONE 2098

BLYTH'S TRADE MARK WILL NOT BURN BLUE BELL BRAND FOLIAGE REGISTERED ARSENATE OF LEAD

13 Years Practical Tests

The Renowned

"BLUE BELL"

Arsenate of Lead

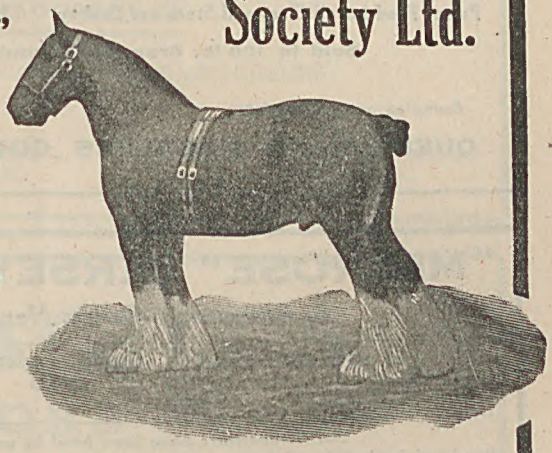
Secure your orders at once.

F. W. PRELL & CO., 31 Queen St., Melbourne

SOLE VICTORIAN AGENTS

'Phone 7419 Central **The Australasian Mutual Insurance Society Ltd.**

400-2 Collins St.,
MELBOURNE.



Live Stock Insured

at Lowest Current Rates obtainable in Australia.

OTHER DEPARTMENTS OF BUSINESS.
Fire, Marine, Fidelity Guarantee, Plate Glass, Personal Accident and Sickness, Employers' Liability, Workmen's Compensation, Public Risk, Motor Car, and Burglary.

☞ INSURE WITH THIS SOCIETY, AND RECOMMEND IT TO YOUR NEIGHBOURS

RESULTS TELL!

FARMERS, THIS WILL INTEREST YOU

The following is the average yield obtained in the wheat plots at Longerenong Agricultural College for five years ending 1919:—

MANURE.	Average Yield for 5 Years.	Increase due to Manure.	Profit Taking Wheat at 4/- per Bushel.
	Bushels.	Bushels.	
1. No Manure	23·8	Nil.	—
2. Superphosphate, 56 lbs. ...	30·4	6·6	£1 6 5
3. Superphosphate, 1 cwt. ...	31·5	7·7	£1 10 10
4. Superphosphate, 2 cwt.	**33·1**	**9·3**	**£1 17 2**

INCREASE THE DRESSING OF SUPERPHOSPHATE PER ACRE, and obtain the maximum profits from the acreage cultivated. Don't forget the following improvement in the stubbles. Try an increased dressing this year for yourself.

Works—
Yarraville (Vic.)
Nth. Fremantle West Australia

M.L.

SUPERPHOSPHATE FOR WHEAT

MOUNT LYELL CHEMICAL WORKS

Office—
"Collins House," 381 Lt. Collins Street, Melbourne

SUGAR CANE MOLASSES

For STOCK, in 40 Gallon Casks and 4 Gallon Tins

"MOLLERNE" (Pure Sugar Cane Molasses and Lucerne Chaff)

Patent Food for all Classes of Stock and Poultry **Highest in Protein and Carbohydrates**

Sold in 100 lb. Bran Bags, ready for the Feed Box

USE IT LIKE BRAN

Samples and prices from

QUEENSLAND MOLASSES COMPANY, MELBOURNE

"MELROSE" JERSEY STUD FARM

A Champion Dairy Herd of Victoria

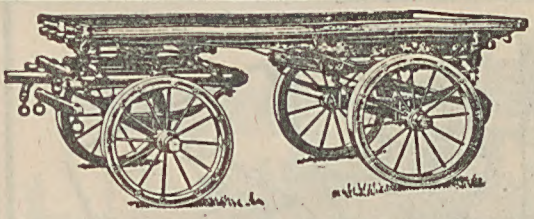
1st Prize Herd 1916 and 1918 Government Herd Test
2nd " " 1917 " 1919 " " "
3rd Herd 1920 " " "

All Competitors have been bred by owner for generations

Breeder of **Jessie 6th of Melrose**, only cow twice Champion under Government Herd Test Regulations, 541½ lbs. butter fat; **Rarity 8th of Melrose**, Champion Cow of Australia, with 718⅜ lbs. butter fat in 273 days, 40 lbs. milk on last day of test; **First Choice of Melbourne**, Sire of 1st Prize Herd, 1919

Young Bulls from Large Producing Cows for Sale

W. WOODMASON, POSTAL ADDRESS:— "TWICKENHAM," WAVERLY ROAD, MURRUMBEENA, VIC.



"Australia's WAGON"

Hildyard Steel Wheel Wagons at the Front. They are now fitted with twin roller bearings, 33 per cent. saved in draft. More durable than ever. Less wear and tear. No boxes to crack. We guarantee them. The rollers run in oil in dustproof races. They are now perfection, and we can supply to carry all weights as usual for wool, wheat, or farm. Ordinary axles supplied if preferred.

J. J. Gordan (Ardlethan) says:—"The 5 ton, 36 in. and 40 in. dia. wheel wagon you supplied me runs splendid. I am putting 60 bags of wheat on 2 horses. That proves its light draught."

Send for Catalog Now **HILDYARD WAGON WORKS,** KENSINGTON, MELBOURNE, VIC.

SUPERPHOSPHATE PROFITS

WHY NOT GET THE BENEFIT OF THESE

The Phosphate Co-Operative Company of Australia Limited

WILL MANUFACTURE SUPERPHOSPHATE FOR THE BENEFIT OF ITS SHAREHOLDERS

OTHER MANURES NOW AVAILABLE

Only a Small Proportion of Shares remain Undisposed of

PRODUCERS ONLY CAN BECOME SHAREHOLDERS

Full particulars from—

Head Office—440 Little Collins St., MELBOURNE.

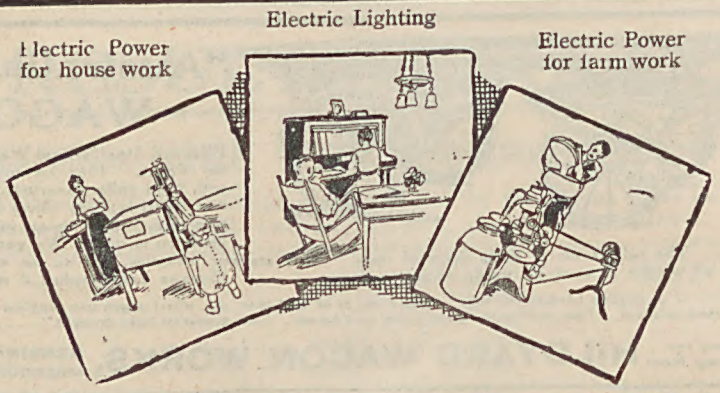
JAS. B. ROBERTSON. Secretary.

LYSAGHT'S

— ORB —

CORRUGATED ROOFING IRON

Full supplies throughout Australia are obtainable from all leading Ironmongers and Timber Merchants



Western Electric

POWER and LIGHT

So simple a boy can run it !

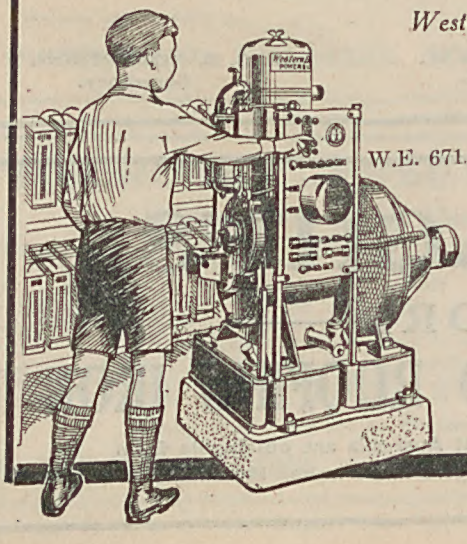
WESTERN Electric Power and Light is built expressly for the country dweller. You need no engineering knowledge. You can understand and learn to operate "Western Electric" in five minutes. Special automatic devices and controls make it the safest and simplest private outfit selling to-day. An intelligent boy can operate it.

The first and foremost duty of "Western Electric" is to banish gloom in the home and flood the barn and milking shed with the brightest, safest light known. This duty alone promotes family happiness and adds ease and pleasure to after-dark and early-morning tasks. But that is only one phase of "Western Electric" service. "Western Electric" provides surplus current for an Electric Iron, Sewing Machine, Dishwasher, etc., that make housekeeping cheaper, better and easier. And the 3¼-H.P. Engine can be used to drive light farm machinery. These three splendid services are detailed in our 20-page post-free book. Send for it to-day, and mark the coupon for the other booklets you want.

C. R. FOSTER

Western Electric Agent for Victoria

262 Flinders St.,
Melbourne



W.E. 671.

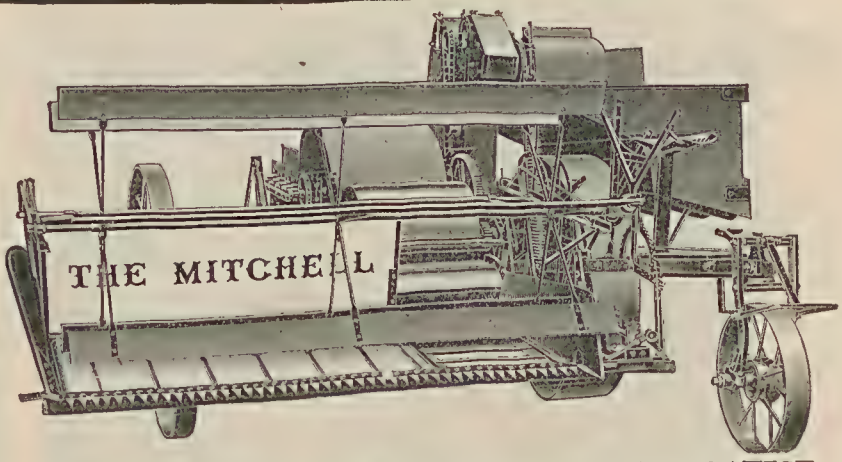
CUT OUT AND POST TO-DAY.

Please send post free the Booklets marked with a cross (X)

W.E. Power and Light.
W.E. Clothes Washer.
W.E. Dish Washer.
W.E. Vacuum Sweeper.
W.E. Sewing Machine.
W.E. Grillers and Toasters.
W.E. Electric Iron.
W.E. Sewing Machine Motor.

Name .....

Address .....



Don't order a Header till you get particulars of the LATEST IMPROVED MITCHELL. It works successfully in light or heavy crops; pulls with five or six horses; is very strongly made and carries our written guarantee as to performance and freedom from defects. Handles musk, mustard weed, and thistles better than any other machine. It is very strongly built. Following are users' opinions:—

"Worked in crop over 6 ft. high, took straw without any trouble."—Stanley Fear, Tundool.

"No other machine can follow the Mitchell for taking off a crop infested with thistles."—A. Roulston, Colbinabbin.

"Swallowed large bundles of tangled crop. Did not leave a grain on heads."—A. C. Moon, Gilgandra, N.S.W.

"Stands alone for making clean sample and wasting no grain."—H. Schirmer, Lockhart, N.S.W.

"First-class order after doing 800 acres."—E. W. Grinter, Oaklands, New South Wales.

"Your 9 ft. pulled lighter than an 8 ft. of another make."—J. A. Reichelt, Lorquon.

"Twice I reached 200 bags in a day, so the machine is speaking well for itself in this district."—C. K. Hill, Manager for Mr. L. A. Martin, Greenethorpe, N.S.W.

"Took off 6,000 bags wheat, 500 bags oats. As good as new."—E. J. Glenn, Mathoura.

"A splendid thresher. Handled crop easily. Made splendid sample. Worked by 6 horses in 11 bag wheat crop 5ft. 6in. high."—W. Glenn, Thyra, Moama, N.S.W.

"The way machine handled musk was a pleasant surprise."—R. J. Biggs, Kellalac.

"Excellent in thistles. Very light in draft. Worked by 6 horses in 10 bag crop."—Ludeman Bros., Dookie.

"1,500 bags wheat and oats. Splendid in either thistly or clean crop. 6 horses on hilly ground. Perfect sample."—F. C. Pieper, Cornella East.

"Splendid satisfaction after 2 years' work, in light and heavy crops."—Jas. Oakes, Nathalia.

MITCHELL & Co. Pty. Ltd.

W. Footscray. 596 Bourke St., Melbourne. Burwood (Sydney).

AGENTS EVERYWHERE.

BARK

Consign your Bark to

S. P. REYNOLDS & CO.

Bark Merchants and Tanners

MACAULAY ROAD, NORTH MELBOURNE

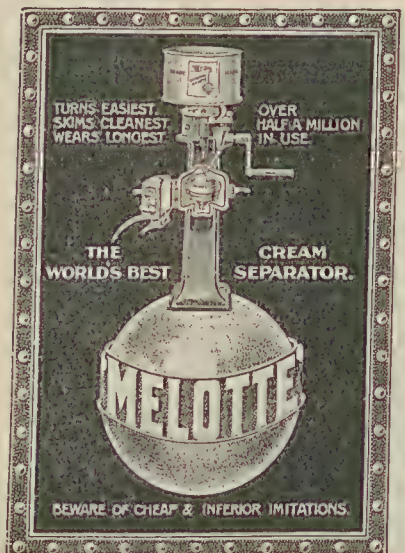
HIGHEST PRICES PAID FOR

BEST BLACK & GOLDEN WATTLE

Consigning Station—Arden Street Siding

THE MELOTTE

is the "Rolls-Royce" of Cream Separators



It keeps going when others are worn-out and done.

It is reliable and gives no trouble, and costs practically nothing to maintain in repair.

The Bowl is suspended, not supported, hence Easy Turning.

The Bowl Casing on stand machine is white enamelled lined, therefore Cleanliness is maintained without effort.

Skims down to ·02.

Made in sizes from 18 gallons up to 130 gallons per hour.

Liberal Discount for Cash, or Easy Terms

T. ROBINSON & CO. Pty. Ltd.

Head Office and Works: SPOTSWOOD, Victoria
Show Rooms: 536-538 BOURKE ST., MELB., Vic.
Distributing Depots for N.S.W. at WAGGA & DUBBO

Mr. J. Lodge's "One Farm" Collection at Bacchus Marsh Agricultural Society's Show.

11. 10. 22

The above illustration indicates the wide range of farm and garden produce grown by Mr. J. Lodge on his 2 acre "farm" at Bacchus Marsh. Mr. Lodge's small holding is situated on red hill land, but water, fertilizers, and hard work have brought it to an extremely high degree of productiveness. Mr. Lodge has used Sulphate of Ammonia on all cereal and root crops here depicted, and attributes the excellent colour and heavy yields obtained to the use of this source of the supply of nitrogen. He is emphatic on the point that Sulphate of Ammonia is essentially a small holder's fertilizer.

The Horticultural authority of his district and a successful exhibitor at local and metropolitan shows, Mr. Lodge's opinion on the subject of manures is well worth having.

Inquiries to the Metropolitan Gas Co., 196 Flinders Street, Melbourne, will elicit full information as to methods of application of Sulphate of Ammonia, prices, &c.

FARMERS and GRAZIERS

NATURE helps those who help THEMSELVES.
FALLOW your land and RETAIN the MOISTURE.
Heavier Dressings of NATURE'S Plant Food.

"Federal" Superphosphate

Will Increase your Wheat Yield

Grass Lands TOP-DRESSED with "FEDERAL" SUPERPHOSPHATE yield more WOOL, a greater percentage of well-nourished LAMBS, and Increased Quantities of MILK.

Particulars supplied by

The Australian Explosives & Chemical Co. Ltd.

135 William Street.

'Phone:
Central 4795 (two lines).

Works:
DEER PARK, VICTORIA.

REGISTERED TRADE MARK

Works—
CURDIE'S RIVER,

Telephone—Central 2807

"BULLDOG" Unburnt (Ground Carbonate) Agricultural Lime

For Orchards, Crops, and Pastures

Its use is strongly recommended by all experts, and those who have had practical experience. Any quantity supplied at shortest notice.

For applying to land we recommend our "Ajax" Lime Spreader

Have you seen our Reinforced Cement Cattle and Pig Troughs?

Rates and full particulars from Distributors—

T. CURPHEY Pty. Ltd. 225 Coppin St. Richmond, Victoria

BURNT LILYDALE LIME

FOR THE LAND

Farmers who have not used **Burnt Lime** should try it. The action of Burnt Lime on the land is **Immediate.** The demand for Building Lime having slackened owing to the War, Farmers have the opportunity of getting a supply of the **well-known Lilydale Lime.** ANALYSIS go as high as 98% Calcium Oxide.

Apply—
DAVID MITCHELL ESTATE, Sole Proprietors, **OLIVER'S LANE, MELBOURNE**

Works—Cave Hill, Lilydale, Tel. Lilydale 4. **Tel. Central 5726**

The Scientific Australian

Australia's Popular Science Monthly

ESTABLISHED 1893

INTERESTING ILLUSTRATED ARTICLES SCIENCE JOTTINGS
NEW INVENTIONS AND PRACTICAL IDEAS

Subscription: 7/6 per annum posted. Specimen copy: 6d. (in stamps).

PETER G. TAIT, 90 WILLIAM ST., MELBOURNE
273 GEORGE ST., SYDNEY

THE USE OF

SICKLE BRAND

FLORIDA SUPER

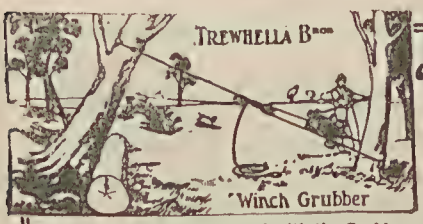
ENSURES INCREASED RETURNS
TO
FARMERS—GRAZIERS—DAIRYMEN
WHEAT

HEAVIER DRESSINGS OF 90 to 112 lbs. PER ACRE INCREASE SUBSTANTIALLY THE YIELD OF WHEAT

MILK — WOOL

A TOP-DRESSING OF 1 CWT. OR UPWARDS PER ACRE ON PASTURE LAND, INVOLVING AN ANNUAL OUTLAY OF ONLY A FEW SHILLINGS, IMPROVES THE QUALITY OF THE GRASS—MAKES CATTLE AND SHEEP MORE HEALTHY—ENABLES THE LAND TO CARRY MORE PER ACRE—RESULTING IN GREATER RETURNS, AS THE CASE MAY BE, OF BOTH MILK AND WOOL

WRITE FOR PARTICULARS **CUMING, SMITH & CO. PTY. LTD.**
65 WILLIAM STREET, MELBOURNE



"1000 TREES & STUMPS GRUBBED OUT"——

Thus writes Mr. J. Sutherland, Parwan.

"I am very well pleased with the Grubbers, as they are doing very good work. With mine I have close on 1,000 trees and stumps grubbed out. I have done all this work myself without any assistance. So I consider the Grubber has more than doubly paid for itself."

Full particulars from—

The "MONKEY WINCH" will save time, labour and money on your land clearing, is always ready, and can be worked in the very roughest country and in any class of timber.

TREWHELLA BROS. PTY. LTD., TRENTHAM

NATIONAL TRUSTEES

Executors & Agency Company of Australasia Ltd.

DIRECTORS:

HON. WALTER MADDEN, Chairman and Managing Director.
EDWARD FITZGERALD, Esq., LL.D. HENRY MADDEN, Esq.
Senator Brigadier-General H. E. ELLIOTT, C.B., C.M.G., D.S.O., D.C.M.
H. V. McKAY, Esq., C.B.E. GERALD P. NEWMAN, Esq.

This Company Acts as Executor or Joint Executor of Wills, Administrator, Trustee of Settlements, and Agent for Absentees under Power of Attorney.

MONEY TO LEND ON BROAD ACRES AND FARM LANDS

Offices—113 Queen St. (Corner of Little Collins-st.), Melbourne

J. H. MACOBOY, Assistant Manager. *HON. WALTER MADDEN, Managing Director.*

New Zealand Loan & Mercantile Agency Co. Ltd.

COLLINS ST., MELBOURNE

LIBERAL CASH ADVANCES

WOOL, SKINS, HIDES, TALLOW, BARK, STOCK AND STATION AGENTS
ON COMMISSION ONLY

LOCAL SALES AND SHIPMENTS OF BUTTER UNDERTAKEN ON OWNER'S ACCOUNT

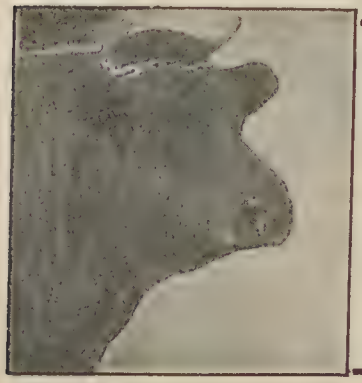
Agents for

PAGE'S WIRE STRAINERS IRONSIDE WIRE CUTTERS
BAILEY'S ANTI-MAMMITIS LOTION

COOPER'S SHEEP DIP

THE BEST

COOPER'S MILK OIL FLUID COOPER'S WORM TABLETS
WEEDICIDE MEDICO
COOPER'S LAVENE



The "Banyule" Jersey Stud

Heidelberg, Victoria—8 miles from G.P.O.

ALL GOVERNMENT TESTED
YOUNG STOCK FOR SALE

Inspection and Correspondence Welcomed.

C. GORDON LYON & R. R. KERR

5546 miles in 67 days

Australia Crossed and Re-crossed

Three Dort Cars establish unprecedented record through sandy deserts, rough rocky country, forest, jungle, and flooded areas

MR. MURRAY AUNGER'S TRIBUTE TO SHELL:

Murray Aunger Motor Co. Ltd.,
Motor Engineers and Importers,
63 Franklin Street, Adelaide,
19th July, 1922.

The British Imperial Oil Co. Ltd.,
Adelaide.

Dear Sirs,

I thought probably you would be interested to know that we used "Golden Shell" Motor Oil in the three Dort Cars that crossed and re-crossed Australia on our recent transcontinental tour.

The Oil was excellent, and I can strongly recommend anybody traversing heavy, sandy country as we did to use

Golden SHELL Lubricating Oil

particularly where the day temperatures are high, and heavy going through sand; also where night temperatures are below freezing point, as often occurred on our recent trip . . . . . .

Another point I would like to mention, that the ***"Golden Shell" Oil proved most economical.***

Yours very truly,
(Signed) H. M. Aunger, Manager,
MURRAY AUNGER MOTOR CO. LTD.

Note the words "excellent" and "economical."

The British Imperial Oil Company Limited

ALL STATES AND NEW ZEALAND

International Combined Cultivator-Drill

Cultivates and Drills at the Same Time

The International cultivator-drill is a combination machine in which the well-known features of the International drill and cultivator are embodied. An exclusive feature of the International is that the four rows of tines are carried on two gangs of floats, thus allowing pressure to be separately applied to the rear ends of both the front and rear floats. By this means the cultivator is held firmly to the soil. The front floats can be operated independently of the rear floats, to which the boots are attached. The frame is strongly built, and the floats being in separate gangs are attached at two points, thus distributing the strain evenly on the machine.

The International cultivator-drill is made in 13, 15, and 17 marker sizes. The 13 marker machine is equipped with 27 tines, the 15 marker with 31 tines, and the 17 marker with 35 tines. The tines are spaced 3½ inches apart, and are fitted with 4 inch points, positively cutting out all the soil. Rubber tubes carry the grain from the hopper to the boots, which are spaced 7 inches apart. Each machine is equipped with a fore-carriage which removes all the weight from the horses' necks.

For full information see the IHC local agent or write us direct for literature.

International Harvester Company of Australia Pty. Ltd.

543-555 Bourke Street, Melbourne

Agents Everywhere

THE JOURNAL

OF THE

Department of Agriculture

OF

VICTORIA.

Vol. XX. December, 1922. Part 12.

DAIRY FARMING.

(Continued from page 656.)

By R. T. Archer, Senior Dairy Inspector.

Milking by Machine.

Labour in connexion with dairying becomes more difficult to obtain year by year, and in many cases it would be practically impossible to carry on but for the aid of the milking machine. No one will claim that the machine is as satisfactory as good hand-milking, but it will be better than poor hand-milking, and much of the hand labour available at the present time is of the latter order. The machine also makes one largely independent of hired labour, which is of great importance. A man will not find it difficult to milk 40 cows or so with the machine, whereas it would be very difficult for him to milk half that number by hand for any length of time. Milking machines are more largely used in New Zealand than in Victoria, and I understand that over 90 per cent. of the cows in some districts there are machine-milked.

There are many machines on the market now which give satisfaction, provided they are properly managed, particularly in regard to cleaning. This must be regularly and properly done, or the results will be disastrous. On the other hand, when proper methods of cleansing are attended to, the milk produced by the aid of the machines will be cleaner than that produced by hand. This is well illustrated by the excellent results of the operations at the Talbot Farm, Cranbourne.

Effect on the Cows.

It is conceded that cows milked by machine suffer less from sore teats than those milked by hand. Some farmers blame milking machines for the spread of contagious mammitis, but this is just as likely to occur in cows that are hand-milked, and precautions are equally necessary whether a herd is milked by hand or by machine.

Cows suffering from mammitis should be milked last and by hand into a bucket containing disinfectant, such as lime, or phenyle. A diseased quarter should never be milked on to the ground, as the germs may adhere to the dust and be carried on to other cows' teats and thus the infection be spread. There is no proof that the yield of milk is detrimentally affected, but there is no doubt that the machine is more satisfactory with heifers broken in to it than with old cows that have been hand-milked. Some consider it a fault that the machines do not milk the cows dry. It is more likely to be beneficial than otherwise that cows must be stripped by hand, for in doing so the udder is subjected to massaging which increases the circulation and maintains the udder at its full productive capacity.

Cleaning the Machine.

As soon as milking is completed the teat cups should be turned into a bucket of cold or tepid water and about a gallon of this drawn through each set to wash out the milk. This should always be done before the milk has had time to dry. Leave them in soak until convenient to finish cleaning; then take to pieces and with hot water and soda brush out all tubes, cups, &c., and then sterilize by boiling in water in which soda has been dissolved at the rate of half a pound to each 10 gallons of water. While not in use or between milkings, keep the cups soaking in limewater. If put away for any length of time the rubbers should be put in a box and covered with French chalk. Never leave rubbers attached to metal or they may stick and tear. Grease is a most destructive agent when left in contact with rubber, and gradually dissolves it. For this reason the parts must be so cleaned that all grease is removed. Great care must be taken to properly clean all the pipes in the releaser plants, otherwise the milk will be contaminated. Good disinfectants for use as well as limewater are weak solutions of formalin or Condy's crystals.

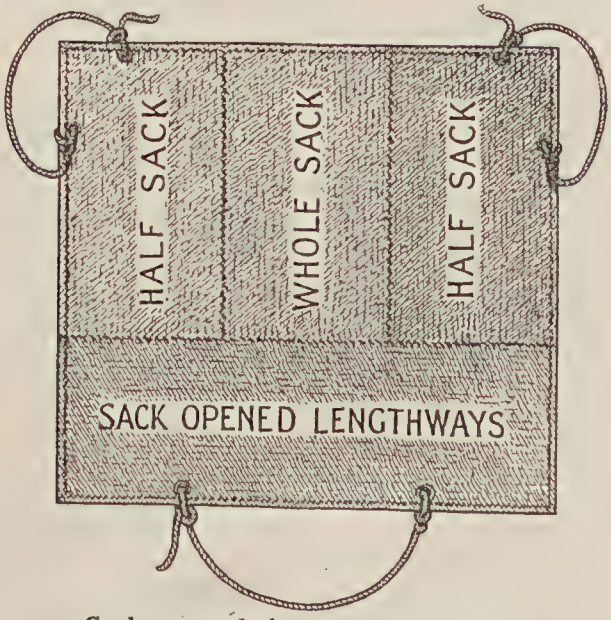
Shade and Shelter.

The production of milk is very largely controlled by nervous action, so for best results the nervous system must be carefully ministered to. Anything that upsets the nervous system will tend to lessen the secretion of milk. For this reason, the comfort of the cow must receive due attention. She must be protected from extremes of heat and cold. A study of the feeding question will explain the necessity for protection from cold. Anything that causes discomfort or irritation will tend to reduce the quantity of milk secreted. To protect cattle against the heat of the summer sun, it is necessary to plant trees in clumps or belts. This will also afford shelter from strong cold winds and rain and provide dry ground for them to lie upon, and thus reduce the risk of mammitis due to getting cold in the udder.

The kind of tree to plant will depend largely upon locality and climate. The climatic conditions of the western plains have been considerably improved by planting belts of sugar gums, which have grown up in a few years, making splendid breakwinds and at the same time providing firewood. Pinus insignis is a very useful tree to grow, as it thrives under almost any conditions, and there is a growing demand for the timber when the times comes for thinning.

Where there is abundance of straw, shelter sheds may prove more convenient. Posts may be erected to bear cross beams and the straw stacked on top. Such a shelter will be found warm in winter and cool in summer. At the Central Research Farm, Werribee, there is a very fine shelter shed built of bails of straw. This would last for many years.

In cold weather cows should be rugged, and they can then graze in comfort. This is a great consideration in winter where cattle are grazed on crops such as Algerian oats, &c. A very satisfactory rug may be made from three wheatsacks—a whole sack to lie from the tail to the withers; half an open sack stitched along each side and another opened lengthwise stitched across the front to lie over withers and shoulders. A cord should be tied across the brisket, and another fairly



Cattle rug made from three wheat sacks.

low down on each thigh to pass under the thigh and through a hole in the rug about the middle of the flank. The ends of these ropes may be fastened to a peg. Another rope for surcingle will complete a very satisfactory rug.

Water.

A plentiful supply of water, clean as possible and easy of access, should be provided. A running stream is an ideal supply. The bore and windmill pump is a very good substitute, when it is possible to find water. Failing these a dam has to be provided, and it should be fenced round to prevent the animals getting into and polluting the water. For good results the cows should drink plenty of water, and this they will not do if it is dirty.

The Home Separator.

When the butter industry was first started in this State practically all the milk was delivered at the factory or at separating depôts. These

sprung up nearly all over Victoria, and were the salvation of the farmers, for at that time, 1889, nearly everything produced on the farm was either unsaleable or at such a low price as to be unprofitable.

The butter exported to London brought such prices as to be highly profitable, and the prosperity brought about by this means soon enabled the State to recover its financial stability. Consequently prices for all classes of produce improved. The industry was new, and the suppliers to the various factories were anxious to make it a success, so they did all they could to deliver the milk or cream to the factory in such a condition that the best possible product could be manufactured. The result was that Victorian butter soon became noted for its high quality. This it retained for many years, until the general spread of the home separator. The principle and construction of the home separator is practically identical with that used in the factory or creamery, the difference being that of size.

Theoretically the home separator should be the means of producing butter of better quality than the factory separator, because, no matter how careful a man is in milking, a certain amount of dirt will find its way into the milk, and the sooner it is removed the better the product should be. The separator is to a great extent a purifier, as all the solid dirt that is in the milk is removed by centrifugal force, and with it a lot of the bacteria that have developed in the milk since it was taken from the cow. As the milk is separated twice daily immediately after milking, it will be easy to see that this must have a very beneficial effect on the cream. In the case of milk separated at the factory, the night's milk is retained in cans and delivered to the factory along with that of the morning; thus there will have been considerable bacterial development overnight.

The milk must be delivered to the factory in a sweet condition, or it would not go through the separator, and the farmer would have to take it home again and feed it to pigs, thereby suffering considerable loss. This compels the supplier to take proper care of the milk by cooling it at night and keeping it in clean utensils. The result is that the manager of the factory has the cream under his control while it is sweet, and is enabled to ripen it properly and churn it when it is just at the correct stage to give the best results, or, in other words, to produce practically all superfine butter. Now, there is no earthly reason why cream from the home separator should not give the same satisfactory results. It all depends upon the care bestowed on the cream.

Milk from the healthy udder of the cow is practically sterile. That is, it is free from germ life, and if milked directly into a sterile bottle and securely corked without being exposed to the air would keep for any length of time practically without change. In practice, however, the milk as it leaves the teat becomes innoculated with various kinds of micro-organisms, depending upon the surrounding conditions. These bacteria, for our purpose, may be divided into two classes—those that are beneficial and those that are detrimental to the production of a first-class article or to the health of the cow. They are of great variety and are everywhere. They are so small that they can be seen only by the aid of a powerful microscope. Every hair, particle of

dust, or scurf off a cow's skin are laden with great numbers of them, so they are falling into the milk all the time it is exposed.

Under favorable conditions they increase and multiply very rapidly. They develop in various ways, some by splitting in two about every half hour, and each half developing into an independent organism, in turn to divide in the same way, so that in twenty-four hours one organism may develop into many millions. Some develop by the production of spores or seeds, and these are the most troublesome to control and destroy. These bacteria increase most rapidly at about the temperature of the animal's body. Milk provides them with food and conditions ideal for their development. This is retarded as the temperature is lowered or raised from the normal temperature of the body. The lower it is reduced the slower the development until when below freezing they practically lie dormant. On the other hand, when the temperature is raised to 140 degrees Fahr. or so, the living bacteria are destroyed. Not so the spores, however. These will withstand great heat, higher than boiling temperature owing to a protective covering. High temperature will destroy the live bacteria, and as soon as the temperature falls to the vicinity of 100 degrees Fahr., the spores or seeds hatch out, develop, and multiply, re-inoculating the milk with bacteria of the most destructive order. What happens when utensils are not properly washed is that hot water will destroy all the organisms which produce a good flavour in butter or cheese, but leave the spores to hatch out as soon as a fresh lot of milk is put into the vessels. If, however, when washing the utensils with hot water a little washing soda be added the spores will be destroyed and the vessels will be cleansed.

Under the Dairy Produce Act, milk or cream must be paid for according to quality, and the dairyman only has himself to blame if he does not receive top price for his product. Although, as before stated, bacteria are everywhere, if proper precautions are taken, those that find access to milk or cream will be those that are desirable and produce good flavours. Those that are responsible for bad flavours are generally directly connected with dirt, so that if one be methodical in his care of the dairy premises and utensils he should be able to deliver milk or cream to the factory in the best possible condition.

To enable this result to be achieved, care must commence where the animals graze or are fed. As stated elsewhere, the water supply must be pure and wholesome. Some of the worst bacteria from a dairyman's point of view are those directly connected with the animal's manure, known as the colon group, the name being derived from its natural home or habitat, *i.e.*, the colon or large intestine of the animal. When these bacteria obtain access to milk they produce gas and putrefactive taints. If a cheesemaker sees pinholey curd, he knows that his milk has been contaminated with this class of bacteria. All possible precautions to prevent this contamination must be taken. The water supply has been found a very frequent source of such contamination. If cows are allowed to walk into a dam to drink, for instance, their droppings become mixed with the mud and earth thereabouts and so reach their udders. This dries, and while the cow is being milked, is falling all the time in the form of dust rickly laden with these colon bacteria, which, immediately they get into the milk, begin to multiply very

rapidly, as the conditions with regard to temperature and food are ideal. Milk provides the most suitable food for bacteria of almost all kinds.

The approaches to the sheds and yards must be kept as clean as practicable, especially in the summer time. Cow-dung must not be allowed to accumulate about the dairy premises, as the movement of the animals and the wind stir up the dry dusty particles, which settle in the milk and utensils. Flies are a very frequent source of contamination. The writer has frequently seen the surface of the milk in a cheese vat literally black with flies. These flies have six legs, at the bottom of each of which is a sucker. The breeding-ground and favorite resting-place of these flies are heaps of manure. A sucker full of this they carry away with them and deposit in the milk. For this reason, manure should be regularly cleaned away from yards and sheds, and put on the land, where it is required in unlimited quantity. The regular lime-washing of cow-sheds helps very materially to keep the fly pest in check.

Before commencing to milk, no matter whether the weather is wet or fine, the cows' udders must be cleansed. If very dirty, it will be necessary to wash them thoroughly. In fine weather, wipe over with a damp cloth rung out of clean water. If an arrangement such as that shown on page 711, consisting of a 10-gallon oil drum with a tap in the bottom, be used, a bit of lime may be placed in the drum, and the resulting limewater will help to keep the cloth, &c., clean and sweet. Limewater is a very good germicide.

Care of the Separator.

The separator should be kept free from dust. Small particles of sand getting into the bearings will cause them to become hot when working, with the result that those parts get rough and worn, and the machine runs unsteadily. This will mean expense for the renewal of the worn parts; in addition, the skimming will be imperfect, and a serious loss of butter-fat will take place.

Only oil of good quality should be used. The use of cheap or inferior oils produces the same effect as the presence of grit on the bearings, and consequently shortens the life of the machine, impairs the efficiency of the work done, and adds considerably to the cost of repairs. Keep all working parts free from dust and well oiled. Do not use a brake of any sort to stop the machine—allow it to run down. An oilcloth or canvas cover will greatly help to keep the dust from the machine when it is out of use, and will well repay any cost and trouble involved.

The separator should be placed in a clean room properly constructed with an impervious floor with a fall to a drain, so that it can easily be washed. Plenty of light and ventilation must be provided, and fly-wire used where necessary to prevent flies having access to the interior.

The machine must be set on a firm foundation to prevent vibration. The best foundation is a concrete pier with bolt embedded, to which is attached 4-in. x 4-in. hardwood, on which the separator may be bolted. A solid wooden block will make a good substitute. Care must be taken to set the machine level.

Cleaning the Separator.

On many dairy farms, neglect to properly clean the separator results in the delivery to the factory of inferior cream. We have already seen that milk originally is pure and clean, but through want of proper care it may become contaminated. A very frequent source of contamination is a dirty separator. Much harm has been done in bringing about this result by the instruction of unscrupulous selling agents, who

A handy device for the milking shed.

have led buyers to believe that it is not necessary to wash the separator each time it is used. The separator acts as a purifier. All the solid dirt is collected in the slime, together with a large number of the bacteria present. The bulk of the slime is casein, a constituent of the milk, which coagulates when it becomes sour. This is ideal food for the development of taint-producing bacteria, and if the machine is not properly cleaned after it is used, it will be in a vile condition by the time the next lot of milk is put through, with the result that irreparable damage is done to the cream.

The bowl should be thoroughly cleaned as soon as possible after separating is finished. First rinse the milk off with cold or tepid water; then thoroughly brush every part, using the proper brushes for this purpose. Never use sand, ashes, a wire brush, or anything that will scratch the tin off. Hot water and soda are the best cleansing agents. Beware of dirty cloths.

Cooling cream or milk.

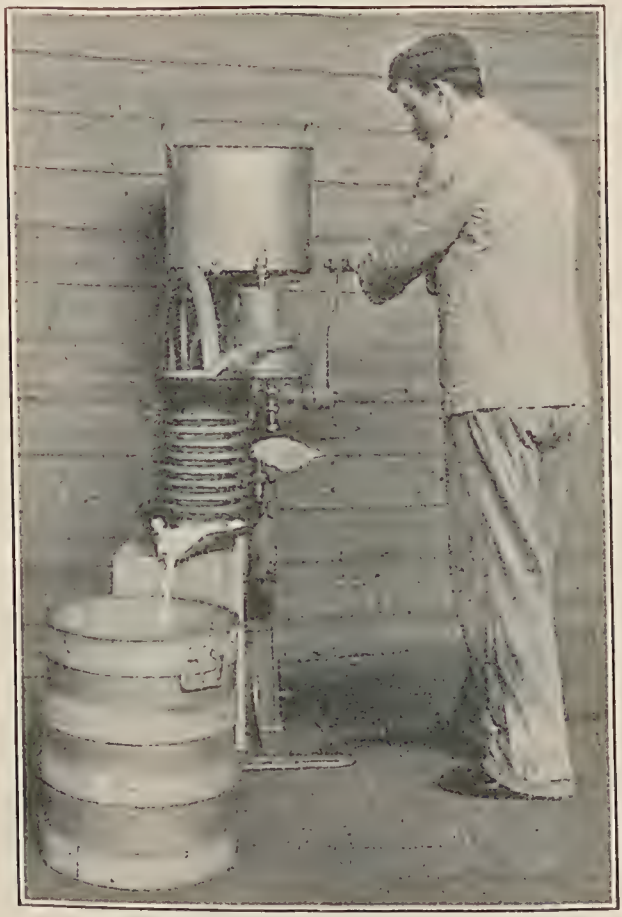
It has been found, in cases where the separator was washed only once a day, that the loss in butter-fat in the skim milk was three times as great as when it was properly cleaned.

Cooling the Milk or Cream.

It is recognised that in practice it is quite impossible to prevent all forms of bacteria getting into the milk, but when due precautions are observed, only those that are in the air will find their way to the milk or cream; these are of the lactic-acid-producing group, and are beneficial in that they produce good flavour in the manufactured product. They, however, must be controlled, or they will develop too rapidly, so that the milk will be too sour for cheese-making.

In the case of cream, when a certain amount of acidity has been produced, it will act as a toxin or poison to the lactic bacteria which lie dormant, and cheesy, rancid, bitter, and other flavours are developed.

While we cannot help a certain amount of innoculation, we must take the necessary steps to keep it in check. The only practical way to do this is to reduce the temperature of the milk or cream immediately after milking or separating. There are various appliances on the market that will enable this to be done. A supply of water must be



Cooling cream as it flows from the separator.

provided for this purpose. In some districts bore water is available, and this is ideal, as it is always sufficiently low to reduce the temperature of the milk or cream to the vicinity of 60 degrees Fahr. In the absence of bore water, underground tanks should be provided. The water used for cooling may be run back into the tank. In some cases, a large water-bag has been found satisfactory. After being cooled, care should be taken to keep the cream cool until it can be sent to the factory. In hot weather, it may be necessary to wrap wet bags round the can.

A very satisfactory arrangement for keeping the cream cool is what is known as the Coolgardie safe. This consists of a framework covered with hession. On top is a vessel holding water, from which strips of material hanging over the side siphon the water out and allow it to trickle over and saturate the hessian. By the evaporation which takes place, the safe is kept cool.

If milk is intended for cheese-making or city supply, it should be run over a cooler of the Laurence pattern as soon as possible after it is drawn from the cow. This drives off the animal heat and odour, and, by reducing the temperature, insures that it will be in good condition when it is delivered. The flavour of the milk thus treated is completely changed, being much sweeter and richer to the taste.

Another separator and cream cooler attachment.

Care of the Cream.

Immediately the cream is separated, it should be run over a cooler and reduced to as low a temperature as possible. There are various makes suitable that may be fixed so that the cream runs over them as it leaves the spout of the separator and straight into the can. Warm fresh cream should never be mixed with cold cream; the fresh must always be cooled before being mixed with the other. When a fresh lot is added to the can, it must be mixed by stirring. The can of cream must be kept cool, and covered with muslin or fine wire gauze to keep out flies and dust.

To obtain the best results, the cream should be delivered to the factory daily, when it should be in such a condition that the factory manager will be able to make choicest butter from it. The longer the cream is kept, the greater the liability to deterioration. As every

supplier is paid for the cream according to its quality, it is to his interest to deliver it as early and in as good condition as possible.

Variations of Test.

Many farmers do not understand the variation in the test of the cream. They think that because, so far as they can tell, the conditions under which the cream is produced are the same from day to day, there should be no variation. The fact is that, should the returns from the factory show no change from week to week, it is indicative that there is something wrong with the testing. Variations are bound to occur that are entirely due to conditions under which the milk is separated. They are to be accounted for by:—1. Smooth running; 2. Speed; 3. Cleaning of the separator; 4. Rate of inflow; 5. Temperature of the milk; 6. Condition of the milk; 7. Richness of the cream; 8. Richness of the milk separated; 9. Amount of water or skim milk used in flushing the bowl.

Smooth Running.—When the machine runs smoothly, the cream is separated from the skim milk, and they find their way to their respective outlets. If there be any vibration, the milk and cream are not properly separated, but become shaken together.

Speed.—Instructions are given with every machine as to the speed at which it should run to obtain the best results. Turning at too high a speed will do no harm, unless such a high rate is attained that the strain is too great for the bowl, and it may burst. The figures given below illustrate what to expect if the speed is varied from that at which the machine should be run:—

Average Per Cent. of Butter-fat Lost in Skim Milk at Different Speeds.

Turns of crank per minute.	Test.
10 too high	.029 per cent.
Normal	.029 per cent.
10 too low	.120 per cent.
20 too low	.210 per cent.

Rate of Inflow.—Each machine is rated to a certain capacity, and must not be overfed. It is necessary, however, to reduce the feed at certain times. For instance, generally in the autumn, the milk is richer and more viscous, and then the rate of inflow should be reduced a little. If the skim milk is tested regularly, the best rate of feed will be ascertained.

Temperature of the Milk.—Warm milk separates more easily than cold, because it is less viscous or syrupy. As it comes from the cow it is in the best condition, being sweet, and over 90 degrees Fahr. It is doubtful if any machine will do good work if the temperature of the milk is below 80 degrees Fahr. The following figures give the loss of butter-fat in skim milk when separated at different temperatures:—

Temperature of Milk.	Loss in Butter-fat.
90 degrees F.	.022 per cent.
75 degrees F.	.051 per cent.
60 degrees F.	.120 per cent.

Richness of the Cream is regulated by the cream screw. While many other factors may affect the test of the cream, the cream screw is depended upon to regulate the percentage of fat. The screw should

be operated so that the test of the cream will be between 40 and 50 per cent. If it is too low, there is too much milk left in, and the cream will go sour more quickly. If it is too high, there may be increased loss in the skim milk, and it is difficult to tin and keep it in good condition.

Richness of the Milk will affect the test, but not the quantity of the cream.

Flushing the Bowl.—The variation in the amount of water or skim milk used in flushing the bowl may cause the test to vary from 2 to 5 per cent., according to the amount of cream.

Feeding for Milk Production.

The cow has been compared to an engine, with the great difference that the cow is a live machine while the engine is lifeless. In the latter, provided the machinery is well cared for and properly lubricated, there is very little wear and tear; but with the cow, there is continual waste of tissue. We feed fuel to a boiler in the form of wood, coal, or oil in order to boil water, and if we stopped as soon as the water boiled, we might as well have burnt the fuel in the open air for any return we would get for it. If we apply more fuel, however, a pressure of steam will be generated, and it is from the additional fuel fed that we get our return.

The same principle applies to the cow. In full milk, she should be given about one-tenth of her body weight per day of a mixture equal to grasses and clovers when in full bloom, *i.e.*, a cow 1,000 lbs. in weight giving 3 gallons of average quality milk, requires 100 lbs. of food per day. This mixture should consist of about 75 lbs. of water and 25 lbs. of dry matter.

The dry matter should be made up of 10 lbs. indigestible fibre, and 15 lbs. of digestible or soluble material; and the soluble matter should contain 12 lbs. carbo-hydrates, 2½ lbs. protein, and ½ lb. fat. This represents a balanced ration, *i.e.*, the different ingredients are in the proportion that the cow can make use of.

Carbo-hydrates, so called because they are composed of carbon and water, and represented in the food by sugar, starch, and gum, are heat and energy producing foods.

Fat or Oil are used for the same purpose, but 1 lb. of fat is equal to 2½ lbs. of sugar or starch.

Protein is the most important part of the food. In addition to carbon and water, it contains nitrogen, phosphorus, sulphur, lime, &c. From this the whole of the cell system of the body is built up, waste of tissue repaired, and the cell system of the udder replenished. The secret of milk production lies in the provision of a plentiful supply of protein.

Balancing the ration means mixing the foods so that the different constituents are in the proportions which can be most economically made use of by the cow. For instance, 100 lbs. of green lucerne contains 3.7 lbs. of protein. That is 1¼ lbs. more protein than a cow can make use of; but 164 lbs. would be required to yield the 12 lbs. of carbo-hydrates, and this would increase the loss of protein to 3½ lbs. Again, with green maize, containing 1 per cent. protein, a cow would require 250 lbs. to get the required amount of protein; but 100 lbs. of green

maize contains the right amount of carbo-hydrates. Consequently, if 250 lbs. of this food is consumed, 17½ lbs. of carbo-hydrates go to waste; or, in other words, for every ton of green maize the cow eats, 1½ tons will go to waste, passing through the system unused.

As it is a physical impossibility for a cow to eat much more than 100 lbs. of green maize a day, she cannot, if fed on maize alone, eat enough to provide her with the requisite amount of protein to keep up her milk flow. On lucerne, she would give her full milk supply, for protein would take the place of carbo-hydrates—the nitrogen, phosphorus, sulphur, lime, &c., passing through the system wasted. This would be an extravagant way of feeding, for in practice it is found that the most expensive constituent of food to provide is protein. By mixing the green maize and lucerne together the ration is balanced. The excess of protein in the lucerne makes up the deficiency in the maize, and the plentiful supply of carbo-hydrates in the maize meets the deficiency in the lucerne.

The quantities specified above apply to the average cow giving an average amount of milk, but they will require to be varied to suit circumstances.

The average composition of milk is as follows:—

Per cent. Fat.	Per cent. Protein.	Per cent. Carbo-hydrates.
3	2.8	4.5
4	3.2	4.9
5	3.6	5.0
6	4.0	4.9

It will be seen that, as milk increases in butter-fat, it increases in protein; that it increases in carbo-hydrates up to 5 per cent. fat, and then there is a slight decrease in milk testing higher than 5 per cent. fat.

A cow giving a greater amount of rich milk will require an increased amount of protein, &c., from which to manufacture that milk.

Careful investigation, extending over many years, has given the necessary data on which to work. It is found that for maintenance, *i.e.*, for heat, energy, renewal of waste of tissue, &c., the cow requires for every 100 lbs. live weight .07 lb. protein, .7 lb. carbo-hydrates, .01 lb. fat. So a 1,000-lb. cow requires .7 lb. protein, 7.0 lbs. carbo-hydrates, .1 lb. fat. Then for each pound of milk of a given per cent. of fat the following nutrients are required:—

For Milk Testing. Per cent. of Fat.	Protein. lbs.	Carbo-hydrates. lbs.	Fat. lbs.
3	.042	.19	.013
3.5	.045	.21	.015
4.0	.048	.23	.016
4.5	.051	.25	.018
5.0	.054	.27	.019
5.5	.057	.29	.020
6.0	.060	.31	.022

Therefore a cow giving 30 lbs. of 4 per cent. milk per day would require for milk-producing purposes 30 times the nutrients specified in the third line of the above table; or —

	Protein. lbs.	Carbo-hydrates. lbs.	Fat. lbs.
For milk production	1.44	6.9	.48
For maintenance	.70	7.0	.10
A total of	2.14	13.9	.58

A cow giving 50 lbs. of 5 per cent. milk per day would require—

	Protein. lbs.	Carbo-hydrates. lbs.	Fat. lbs.
For milk production ..	2.7	13.5	.95
For maintenance ..	.7	7.0	.10
A total of ..	3.4	20.5	1.05

Balancing the Ration

To make up a balanced ration, proceed as follows:—Suppose a cow weighs 1,200 lbs., and gives 40 lbs. of 5 per cent. milk. The table shows that for maintenance she would require for each 100 lbs. live weight, .07 lb. protein, .7 lb. carbo-hydrates, and .01 lb. of fat. These figures, multiplied by twelve, give the required amount for maintenance, viz.:—.84 lb. protein, 8.4 lbs. carbo-hydrates, .12 lb. fat; and for each pound of milk testing 5 per cent. of fat, .054 lb. protein; .27 lb. carbo-hydrate, .019 lb. fat. Multiply these figures by 50, and the required amount of nutrients for milk production is shown, viz.:—

	Protein. lbs.	Carbo-hydrates. lbs.	Fat. lbs.
Total for milk ..	2.7	13.5	.95
Total for maintenance ..	.84	8.4	.12
Total required ..	3.54	21.9	1.07

Making up the Ration.

	Feed. lbs.	Protein. lbs.	Carbo-hydrates. lbs.	Fat. lbs.
Oat hay chaff ..	20	.900	8.74	.30
Linseed meal ..	2	.522	.77	.13
Wheat bran ..	6	.672	2.53	.15
Polly feed ..	3	.420	1.56	.06
Crushed wheat ..	4	.548	1.90	.056
Maize silage ..	30	.540	4.05	.18
		3.602	19.55	.87

This ration allows plenty of protein, but is somewhat deficient in carbo-hydrates. This may be rectified by the addition of a few pounds of molasses.

Then take a cow grazing on green oats:—

	Protein. lbs.	Carbo-hydrates. lbs.	Fat. lbs.
110 lbs. gives	2.86	21.79	1.10
Add 5 lbs. lucerne hay chaff	.61	1.85	.08
	3.47	23.64	1.18

If she is grazing on grass, she will require the addition of a few pounds of food rich in protein to enable her to keep up the big flow of rich milk.

In the above ration, it will be noticed that the roughage, *i.e.*, oaten hay chaff, contains practically sufficient of the various nutrients for maintenance, and therefore the concentrates are required for milk production.

There is no need for a farmer to work out the actual ration, as, after years of investigation, it has been found satisfactory in practice to allow 1 lb. of concentrates for every 3 lbs. of milk the cow is giving, if

it is rich milk; and 1 lb. for every 4 lbs. if it is average quality, in addition to as much roughage as she will eat.

Danish System of Food Standards.

The Danes have done an immense amount of experimental work in connexion with feeding, and have worked out a system of food standards. Their standard unit is 1 lb. of concentrated feed, *i.e.*, cereals, mill offal, oil meal, &c.—

2½ to 3 lbs. of good meadow hay equals one standard.
4 lbs. of poorer hay equals one standard.
10 lbs. of swedes equals one standard.
12 lbs. of white turnips equals one standard.
4 lbs. of potatoes equals one standard.
10 lbs. of green fodder equals one standard.
6 lbs. of buttermilk equals one standard.
6 lbs. of skim milk equals one standard.
12 lbs. of whey equals one standard.
1 lb. of new milk equals one standard.

For maintenance, one standard is required for every 150 lbs. live weight, and for milk production one standard for each 1 lb. of milk. The above system has been very largely adopted, both in England and America, and found to work satisfactorily. It is, moreover, simple in application.

Comparative Values of Stock Foods.

To ascertain which are the most economical foods to purchase, the following method of estimating the comparative values of stock foods is approved by leading authorities on the subject. It is estimated on the unit value, which is calculated as under:—

Percentage of protein plus fat multiplied by 2½ plus carbo-hydrates divided into market price.

Example—

Linseed Cake (Meggitt's Meal, Etc.).

Protein	26·1%	= 32·6 × 2½ =	81·5
Fat	6·5%		
C.H.	38·5%		38·5
			120·0 food units £11 = 1s. 10d. per unit

Bran.

Protein	11·2%	= 13·7 × 2½ =	34·25
Fat	2·5%		
C.H.	42·2%		42·2
			76·45 food units £5 = 1s. 3½d. per unit.

Oaten Hay.

Protein	4·5%	= 6·0 × 2½ =	15·0
Fat	1·5%		
C.H.	43·7%		43·7
			58·7 food units £2 10s. = 10¼d. per unit

Lucerne Hay.

Protein	12·3%	= 13·9 × 2½ =	34·75
Fat	1·6%		
C.H.	37·1%		37·1
			71·85 food units £5 = 1s. 4½d. per unit

Comparative Value of Foods.

Grain.

	Digestible Nutriments.			Food Units.	Worth when Bran is 1s. per bushel, £5 per ton.
	Protein.	Fat.	Carbo-hydrates.		
	per cent.	per cent.	per cent.		per bushel.
					£ s. d.
Peas	19·4	1·0	49·9	101·0	0 4 0
Beans	22·1	1·2	44·1	102·3	0 4 0
Wheat	13·7	1·4	47·6	85·3	0 3 4
Barley	9·6	2·1	63·5	92·7	0 3 0
Maize	7·8	4·3	66·7	96·9	0 3 8
Oats	9·2	4·2	47·3	80·8	0 2 1
Millett	8·0	3·1	45·8	73·5	0 2 11
Rye	9·6	1·1	63·9	90·6	0 3 6
					per lb.
Linseed	19·4	34·7	18·0	155·2	0 0 1¼

Products.

					per 2,000 lbs.
Bran	11·2	2·5	42·2	76·4	5 0 0
Pollard	12·2	3·8	53·4	93·4	6 2 0
					per 2,240 lbs.
Linseed cake	26·1	6·5	38·5	120·0	8 16 0
Coconut oil cake	16·4	9·1	42·2	106·0	7 15 0
Dried blood	52·3	2·5	0·0	137·0	10 0 0
Maize oil meal	18·7	20·9	27·1	126·0	9 4 0
Polly feed	14·0	2·0	52·0	92·0	6 14 0
Mollerne	11·3	2·9	47·0	82·0	6 0 0
Corn and cob meal	8·4	2·0	7·2	96·2	7 0 0
Malt combings	14·9	7·9	51·8	109·0	7 19 0
Oat branning	9·6	5·5	54·1	91·8	6 14 0
Rice meal	11·8	13·3	48·4	111·1	8 2 0
Oat hulls	1·6	0·6	49·4	55·0	4 0 0
Molasses	..	..	62·0	62·0	4 10 0
Pea refuse	17·4	1·5	53·1	100·3	7 7 0
Cocoa husk meal	0·6	5·2	22·3	36·8	2 13 0
Brewers' grains, wet	3·9	1·4	9·3	22·5	1 13 0
Brewers' grains, dry	20·0	5·7	38·0	102·2	7 9 0

COMPARATIVE VALUE OF FOODS—*continued.*

GREEN FODDER.

	Digestible Nutrients.			Food Units.	Value per ton.
	Protein.	Fat.	Carbo-hydrates.		
	per cent.	per cent.	per cent.		£ s. d.
Barley	1·9	0·4	10·2	15·9	1 3 0
Cocksfoot grass ..	1·5	0·5	11·4	16·4	1 4 0
Clover (red)	2·9	0·7	14·8	23·8	1 14 0
Lucerne	3·7	0·6	7·3	18·0	1 6 0
Maize	1·0	0·4	11·6	15·1	1 2 0
Oats	2·6	1·0	18·9	27·9	2 0 0
Rye	2·1	0·4	14·1	20·3	1 9 0
Sorghum	0·6	0·4	12·2	14·7	1 1 0
Vetch	3·9	0·5	7·3	18·3	1 6 0
Rape	1·0	0·2	7·2	10·2	0 14 0
ROOTS.					
Mangels	1·1	0·1	5·4	8·4	0 12 0
Maize silage	1·8	0·6	13·5	19·5	1 8 0
Pumpkins	1·0	0·3	5·8	9·0	0 12 6
Sugar beet	0·9	..	20·3	22·6	1 13 0
Beet slices	0·3	..	4·0	4·75	0 7 0
Swedes	1·0	0·2	7·2	10·2	0 14 6
Cabbage	1·8	0·4	8·2	13·7	0 19 6
Carrots	0·8	0·2	7·8	10·5	0 15 0
Potatoes	0·9	0·1	16·3	18·8	1 6 10

HAY.

	Digestible Nutrients.			Food Units.	Value per ton when Oaten Hay is £4 6s.
	Protein.	Fat.	Carbo-hydrates.		
	per cent.	per cent.	per cent.		£ s. d.
Oaten	4·5	1·5	43·7	58·7	..
Lucerne	12·3	1·6	37·0	72·0	5 5 0
Wheaten	3·5	1·2	34·2	45·9	3 7 0
Grass (good)	6·1	1·2	37·8	56·0	4 2 0
Vetch	12·9	1·4	37·5	73·2	5 6 0
Clover	6·8	1·7	35·8	57·0	4 3 0
STRAW.					
Oat	1·2	0·8	38·6	43·6	3 3 0
Barley	0·7	0·6	41·2	44·4	3 4 0
Wheat	0·4	0·4	36·3	38·3	2 14 0
Pea	4·3	0·8	32·3	45·0	3 5 0

THE PIG.

Until recently, the pig has been the means of obtaining the highest returns for the by-products of the dairy, viz., skim milk, buttermilk, and whey. The war, however, gave an impetus to the development of industries which give a better return for the by-products. The demand for casein has increased to such an extent that many factories are now extracting all they can from the separated milk, leaving only whey for feeding to pigs. All the same, there are many districts yet where separator milk and whey will for a long time be converted into pork.

The pig industry has been fully dealt with in Bulletin 16, and there is no need to repeat any portion of it here. It may be stated, however, that it is quite easy to calculate whether the conversion of the by-products of milk into pork will be more profitable than to let the factory have them for the manufacture into casein, dried milk, milk sugar, &c.

Thirty pounds of separated milk will produce 1 lb. of pork. So if pork is bringing 6d. per lb., 1 gallon of skim milk will be worth 2d. per gallon, or if we deduct ½d. for working expenses, 1.83d. per gallon. Buttermilk is equal to skim milk if no water be added; but, of course, the addition of water reduces its value to the extent of amount of water added. Whey, although it looks so watery, is worth just half as much as skim when fed to pigs; but, as shown in the above-mentioned bulletin, they must be mixed with grain or mill offal to give satisfactory results.

THE BUTTER-FAT TEST.

Can it be Increased?

Mr. H. G. van Pelt, one of the world's foremost dairy enthusiasts, when asked "Can a cow's butter-fat be increased?" told his inquirer that every cow has a maximum butter-fat test gained by heredity. She can be so fed and cared for that she will produce milk for that test, but she cannot regularly stimulate unerringly such a maximum test without deviation; but the knowledge available does not permit of this as yet. It is well known that a well-balanced ration which provides all of the essentials in abundance for maintaining the body of the cow and providing for her largest butter-fat production is conducive to securing the best possible percentage test and the largest possible milk flow. It is also known beyond dispute that comfortable conditions favour a high test, and, on the other hand, all factors that detract from the comfort of a cow detract from the butter-fat percentage. No doubt that is the reason why cows test lower in mid-summer, when the heat is intense and flies pesky, than during the other months of the year.

STANDARD HERD TEST.

REPORT FOR QUARTER ENDED 30th SEPTEMBER, 1922.

The cows which finished during the quarter number 450, of which 332 qualified for the certificate. Individual returns are as follow:—

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard Required.	Estimated Butter.	Previous Butter Fat Records in lbs
								lbs.	lbs.		lbs.	lbs.	lbs.	
Mrs. F. M. Akehurst, Tunstall	1	Nil	Jersey											
The Alston Estate, Cobram	6	5	Jersey ..	Annie G. of Tarnpirr ..	6022	21.10.21	273	11	5,889	5·75	338·84	250	386¼	284
				Regina of Tarnpirr	Not yet allotted.	24.10.21	273	12½	5,440	6·18	336·14	200	383½	253
				Idyll's Ideal	2096	1.11.21	273	12½	5,945	4·84	287·48	250	327¾	269, 340, 335, 284
				Sunflower of Tarnpirr ..	Not yet allotted.	14.11.21	273	13½	4,105	5·25	215·49	175	245¾	
				Belladonna of Aberdour ..	Not yet allotted.	22.11.21	273	17½	4,457	5·20	231·82	175	264½	
J. Anderson, junr., Lyndhurst	2	2	Jersey ..	Linda 52nd of Kingsvale ..	9,177	26.10.21	273	20½	6,249	5·84	364·91	175	416	
				Canary 12th of Kingsvale ..	Not yet allotted.	25.12.21	273	28½	7,582	5·33	404·17	..	460¾	
L. F. Armstrong, Hesket, near Woodend	1	1	Ayrshire	Bertha 2nd of Ellerslie ..	Not yet allotted	11.11.21	273	15½	5,932	4·21	249·52	175	284½	
W. H. Atherton, Murray Vale, near Swan Hill	3	3	Jersey ..	Quality of Meadowvale ..	..	2.10.21	273	16	5,129	5·71	293·12	175	334½	
				Tiny of Meadowvale ..	..	4.10.21	273	17½	5,883	6·35	373·59	175	426	
				Rarity of Meadowvale ..	..	20.11.21	273	14	5,263	6·28	330·52	175	376¾	
W. K. Atkinson, Swan Hill	4	4	Shorthorn	Cherry of Willow Park ..	9198	28.9.21	273	30	12,017	3·94	474·06	200	540½	325
				Princess of Willow Park ..	Not yet allotted	29.9.21	273	22½	7,054	3·63	256·10	175	292	
				Blush of Willow Park ..	,,	6.10.21	2 73	25	8,144	3·93	320·02	175	364¾	
				Cherry 5th	10893	27.11.21	273	12½	7,608	3·73	284·02	250	323¾	235, 218, 269, 343

CERTIFICATED COWS—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard Required.	Estimated Butter.	Previous Butter Fat Records in lbs.
								lbs.	lbs.		lbs.	lbs.	lbs.	
C. Bamford, Benalla	1	1	Ayrshire	Trixie of Medburn Grove ..	7005	14.10.21	273	11	6,683	5·02	335·54	200	382½	246
A. E. Batson, Buckley, near Winchelsea	5	1	Jersey ..	Lady Marge of Ferndale ..	6368	29.9.21	273	11	5,183	5·44	281·80	250	321½	278
Mrs. J. Beard, Outtrim	2	2	Jersey ..	Mary Birt of Kelburn ..	Not yet allotted.	14.10.21	273	15½	5,614	5·54	311·13	200	354¾	
				Shadow of Luscombe* ..	6143	1.11.21	273	11	7,266	5·37	390·36	250	445	262, 281, 323
F. W. Beischer, Bendigo	3	2	Jersey ..	Jessemia 13th of King's Vale† ..	..	29.11.21	246	14½	4,349	5·94	258·30	200	294½	181
				Annette 2nd of King's Vale ..	9203	16.12.21	273	15	5,730	4·91	281·35	250	320¾	304, 305
J. Benallack, Elliminyt, near Colac	4	3	Ayrshire	Phyllis of Woodbyrne ..	6119	25.10.21	273	9½	5,126	4·34	222·46	175	253¾	
				Baronia of Woodbyrne ..	4893	5.10.21	273	4	6,465	4·43	286·56	200	326¾	264
				Molly of Woodbyrne ..	6118	1.11.21	273	5½	4,684	3·98	186·19	175	212½	
F. Bidgood, Staghorn Flat, near Wodonga	3	2	Jersey ..	Butter Queen of Staghorn ..	5591	3.10.21	273	7½	5,851	5·22	305·67	250	348½	193
				Milkmaid of Staghorn ..	9212	29.10.21	273	17½	6,177	5·52	341·26	200	389	229
Mrs. Agnes Black, Noorat	1	Nil	Jersey											
A. A. Broad, Sutton Grange	1	1	Jersey ..	Goldfinch of Fair View ..	7183	30.9.21	272	16	5,118	5·34	273·25	200	311½	
Callery Bros., Bannockburn	7	5	Ayrshire	Snowflake of Rythdale ..	2842	6.10.21	239	4	6,931	3·95	273·40	250	311½	241, 346
				Pixie of Langley Park ..	8552	15.10.21	273	19	6,371	3·61	229·91	175	262	
				Alma of Langley Park ..	3477	14.10.21	273	10½	7,155	3·75	269·55	250	307½	290, 326, 350
				Ada of Langley Park ..	8542	14.11.21	273	22	7,147	4·17	297.76	175	339½	
				Madge of Langley Park ..	8547	10.12.21	273	10	4,490	4·24	190·21	175	216¾	

* Entry deferred one week owing to milk fever. † Withdrawn before completion of term.

CERTIFICATED COWS—*continued.*

Owner.	No completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard Required.	Estimated Butter.	Previous Butter Fat Records in lbs.
								lbs.	lbs.		lbs.	lbs.	lbs.	
Dr. S. S. Cameron, Hawthorn	1	1	Friesian	Ashlynn 63	Not yet allotted.	12.10.21	273	9	5,681	3·36	191·15	175	218	
H. D. W. Canobio..	6	4	Ayrshire	Annetta of View Point ..	4959	10.10.21	262	4	7,146	3·81	272·46	250	310¾	316
				Jessie's Pride of Bundara ..	4263	20.10.21	273	6	8,038	3·66	293·98	250	335¼	355, 295, 383
				Model of Woodstock Grange	4961	2.11.21	273	13	5,639	4·72	266·51	200	303¾	
				Primrose of Wethersdane ..	5285	8.11.21	273	12½	6,600	3·98	262·79	250	299½	
Mrs. M. E. Carroll, Tyntynder Central	2	2	Red Poll	Cambria	430C	9.10.21	270	4	6,220	4·06	252·54	250	288	200, 287
				Scotia	525D	3.11.21	273	10	7,089	3·59	254·28	250	289¾	304, 318, 295, 379
P. Chirnside, Oakleigh	3	3	Jersey ..	Keepsake of Warenda ..	Not yet allotted	12.10.21	273	13	5,593	6·24	348·86	200	397¼	248
				Phyllis 2nd of Warenda ..	7195	15.10.21	273	12½	7,411	5·01	373·46	200	425¾	310
				Graceful Countess 2nd of Lesterfield	Not yet allotted	26.11.21	273	19½	5,863	6·30	369·45	200	421¼	210
J. W. Cochrane, Moorabbin	10	4	Ayrshire	Rosette of Springfield ..	6242	19.10.21	273	22	6,626	3·99	264·20	175	301¼	
				Ruby of Springfield ..	6243	12.11.21	265*	15	6,778	4·08	276·96	200	315½	243
				Cowslip of Devon Park ..	7863	18.11.21	222*	10	5,919	4·84	286·88	250	327	295
				Ada of Rythdale Park ..	6081	19.12.21	228*	24	7,299	3·91	285·65	250	325¾	
Cockbill and Gibbs, Bamawm Extension	27	9	Ayrshire	Mona of Wethersdane ..	9618	27.9.21	273	10	4,934	4·33	213·46	175	243¼	
				Blossom of Wethersdane ..	9592	30.9.21	273	7	5,140	3·98	204·33	175	233	
				Tottie of Warrook	8916	2.10.21	252	4	5,087	4·36	221·96	200	253	240
				Snowy 2nd of Mt. View ..	8914	5.10.21	253	4	4,842	3·71	179·54	175	204¾	
				Sunshine of Roxburgh ..	6335	13.10.21	265	4	5,163	4·25	219·61	200	250½	
				Belle of Wethersdane ..	7438	14.10.21	273	9	4,775	3·94	188·32	175	214¾	
				Nannie 2nd of Burnside ..	3932	19.10.21	273	10½	6,607	3·93	259·35	250	295¾	
				Fashion of Warrook ..	5171	1·11·21	244	4	5,684	4·49	255·96	250	291½	269, 319, 299
				Bardy of Winslade	8212	25.11.21	273	11	5,383	4·45	239·56	175	273	

* Sold before completing term.

Certificated Cows—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard Required.	Estimated Butter.	Previous Butter Fat Records in lbs.
								lbs.	lbs.		lbs.	lbs.	lbs.	
W. J. Colman, Kerang	1	1	Jersey ..	Molly 2nd of Clover Flat ..	5488	24.10.21	273	11	7,312	5·47	400·17	250	456¼	
W. T. Cullen, Warrion	13	3	Ayrshire	Olive of Riccarton	6507	26.9.21	273	5	4,493	4·15	186·35	175	212½	
				Boronia of Retreat ..	4321	30·9·21	273	9½	6,558	3·99	261·08	250	298¾	238, 332
				Bessie of Roxburgh ..	7466	11.12.21	273	25½	6,144	4·20	257·74	250	294	
O. Cutler, Longwarry South	1	1	Jersey ..	Bright Stockings of Warenda..	7189	29.9.21	273	11	5,901	5·01	295·84	200	337½	238
R. G. Dent, Moe ..	1	1	Red Poll	Coney	..	4.10.21	260*	9½	4,396	4·77	208·31	175	237½	
				Flowing Vale										
Department of Agriculture, Werribee	7	7	Red Poll	Ontario	399C	28.9.21	273	16	8,807	3·86	340·06	250	387½	200, 323, 304, 249, 362, 315
				Latakia	396C	29.9.21	273	19½	10,797	4·66	504·08	250	574½	351, 390, 463, 460
				Victoria Red Rose	3AA	14.10.21	273	15½	7,437	4·12	306·50	250	349½	346, 284
				Queen Elizabeth	400C	24.10.21	273	23½	9,621	4·44	427·64	250	487½	300
				Pacifica	Not yet allotted.	15.10.21	273	18½	7,427	3·49	259·34	250	295¾	279, 263
				Tonga	253A	19.11.21	273	21	12,306	4·16	512·90	250	584½	293, 349, 384, 424, 408
				Avesia	287B	18.12.21	273	21	9,833	4·17	410·84	250	468½	280, 335, 309, 440, 304
	1	1	Friesian	Victoria Bellona	Not yet allotted	18.10.21	273	24	6,438	3·69	237·54	175	270¾	
Dickinson Brothers, Sebastopol	2	2	Friesian	Queenie of Ashby	267	2.10.21	273	20½	12,604	3·86	486·95	250	555	296, 440
				Countess 2nd of Ashby ..	328	7.10.21	273	16	8,273	3·58	295·39	200	336¾	217

* Withdrawn before completion of term.

CERTIFICATED COWS *continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard Required.	Estimated Butter.	Previous Butter Fat Records in lbs.
								lbs.	lbs.		lbs.	lbs.	lbs.	
T. Douglas, Smythe's-road, Ballarat	7	5	Ayrshire	Greatness of Roxburgh ..	5125	25.9.21	223	4	6,343	4·03	255·69	250	291½	264, 300
				Graceful of Roxburgh ..	9046	21.10.21	226	4	5,114	4·98	254·89	250	290½	264
				Gaiety of Roxburgh ..	6322	20.11.21	268	4	5,512	3·69	203·75	175	232¼	
				Gladsome of Roxburgh ..	6325	4.12.21	205	18	6,570	3·63	238·72	200	272¼	
				Purest of Roxburgh ..	5128	15.12.21	273	8	6,887	4·00	275·64	250	314¼	
C. Falkenberg, Elliminyt	2	Nil	Jersey											
A. W. Findley, Leitchville	3	3	Jersey ..	Attraction of Tuerong* ..	Not yet allotted	1.10.21	273	11	5,163	5·55	286·83	175	327	
				Canary of Tuerong	...	14·10.21	269	11½	5,133	5·17	265·41	175	302½	
				Werribee Northwood's Attraction	6538	20.10.21	273	12½	6,235	5·48	341·49	250	389¼	
Finn Brothers, Bundoora	4	4	Jersey ..	Tulip 2nd of Meridale ..	Not yet allotted	9.10.21	273	11½	6,915	5·18	358·45	200	408¾	305
				Curiosity of Holmwood ..	6483	30.10.21	273	11½	5,551	5·37	297·84	250	339½	
				Valda's Queen of Somerville	5948	13.11.21	273	14	7,364	4·56	336·07	250	383	464
				Foxglove 2nd of Tarnpirr ..	7054	21.11.21	273	16	5,940	5·84	346·85	250	395½	249
W. Fixter, Boisdale	1	1	Jersey	Beauty's Daffodil of Lesterfield	Not yet allotted	15.12.21	273	28	7,663	4·75	363·97	250	415	304, 208
Flack and Sewell, Berwick	15	12	Friesian	Springfield No. 4	Not yet allotted	1.10.21	273	19½	8,107	3·61	292·66	175	333¾	
				Dominion Cora	261	4.10.21	273	22½	10,835	3·44	372·59	250	424¾	269, 305
				Holland Lass 2nd of Berry ..	244	5.10.21	273	21	11,864	3·41	404·05	250	460¾	204, 419
				Dominion Iona	263	5.10.21	265	14½	12,303	3·11	382·17	250	435¾	336, 225, 361
				Dutch Girl 2nd of Berry ..	221	9.10.21	273	21	9,920	3·74	371·37	250	423½	208, 327
				Dominion Violet Fobes ..	255	10.10.21	273	20	13,676	3·40	465·04	250	530½	466, 308, 484
				Dutch Girl of Berry ..	141	16.10.21	273	20½	9,033	3·46	312·56	250	356½	
				Monovale Catriona Paxton ..	551	19.10.21	273	27½	11,846	3·48	412·49	200	470½	356
				Monovale Primrose Paxton ..	200	18.11.21	265	4	6,971	3·67	255·63	200	291½	
				Lady Thenea Alcartra ..	203	26.11.21	273	8½	7,885	3·18	250·62	250	285¾	
				Burnbank Mercedes Maggie ..	Not yet allotted	2.12.21	273	25½	9,326	3·30	307·32	175	350¼	
				Dominion Homestead Maggie	259	7.12.21	249	4	9,744	3·24	315·67	250	359¾	330, 373

* Exempted nine days—injury to udder.

CERTIFICATED COWS—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.	Previous Butter Fat Records in lbs.
								lbs.	lbs.		lbs.	lbs.	lbs.	
Mrs. M. and W. A. Francis, Kilcunda	2	1	Ayrshire	Olive Berry of Glenbrae ..	5912	28.10.21	273	11	6,721	4·06	272·63	200	310¾	184
M. Galbraith, Tyers	4	4	Ayrshire	Crissy 2nd of Rathlyn ..	7292	8.10.21	236	4	5,824	4·60	267·71	250	305½	
				Dahlia of Retreat	4324	17.10.21	230	4	6,398	4·60	293·68	250	334¾	253
				Marigold of Retreat ..	4333	24.10.21	208	4	6,148	4·44	273·04	250	311½	
				Daphne of Mt. Hope ..	7293	8.11.21	226	4	4,472	4 10	183·3[illegible]	175	209	
G. Gange, Mininera	6	2	Ayrshire	Eva 2nd of Glencairn ..	7298	29.9.21	273	18	6,596	4·01	270·44	200	308½	280
				Wisteria of Kelvin Grove ..	3298	24.10.21	273	7	6,644	4·02	267·08	200	304½	300
N. Gange, Mininera	2	2	Ayrshire	Petal of Roseleigh	7303	22.11.21	273	8½	6,571	3·63	238·26	200	271¾	
				Winnie of Kelvin Grove ..	4849	12.12.21	273	11	6,492	4·50	291·90	200	332¾	
Geelong Harbor Trust, Marshall	8	8	Ayrshire	May of Sparrovale	3902	2.10.21	273	12½	8,439	4·14	349·77	250	398¾	236, 267, 276
				Meadow Sweet of Sparrovale..	3903	5.10.21	273	6	6,684	4·40	294·19	250	335¼	278, 316, 360
				Daisy of Sparrovale ..	3888	25.10.21	273	9½	6,556	4·55	298·00	250	339¾	290, 317
				Beatrice of Sparrovale ..	3882	30.10.21	273	6	7,188	3·90	280·11	250	319¼	286, 253, 259
				Blossom of Sparrovale ..	3885	24.11.21	273	9	6,849	4·34	306·91	250	349¾	266, 315
				Mabel of Sparrovale ..	7315	1.12.21	273	15½	6,123	4·18	255·73	175	291½	
				Flora of Sparrovale.. ..	3891	8.12.21	273	5½	6,271	4·62	289·77	250	330¼	203, 287, 307
				Melba of Sparrovale ..	3904	15.12.21	273	11	6,366	4·30	273·84	250	312½	264, 287
H. S. Gibson, Murraydale	5	5	Ayrshire	Lupin of Ellerslie	7577	25.9.21	273	7	6,591	3·76	248·02	200	282¾	
				Dulcie of Evergreen ..	9115	7.10.21	273	14	6,072	4·33	262·90	175	299¾	
				Lady Em of Evergreen ..	7320	15.10.21	273	7	5,820	4·07	237·67	200	271	242
				Trixie of Evergreen ..	6362	23.10.21	273	5½	8,770	4·54	398·40	250	454¼	332, 375
				Princess of Winslade ..	6984	2.12.21	259	5½	4,552	4·97	226·25	200	258	

CERTIFICATED COWS—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.	Previous Butter Fat Records in lbs.
								lbs.	lbs.		lbs.	lbs.	lbs.	
R. Goodman, Kilmany South	1	Nil	Ayrshire											
D. F. Griffiths, Inverleigh	4	4	Ayrshire	Rachel of Gowrie Park ..	5185	25.9.21	273	16½	7,065	3·97	280·92	250	320¼	
				Joy of Struan Park.. ..	5182	29.9.21	273	18½	8,107	4·71	381·76	250	435½	
				Gladness of Gowrie Park ..	5177	3.10.21	273	16½	8,475	4·40	372·97	250	425¼	
				Heather of Struan Park ..	5180	27.10.21	273	14	6,305	4·57	288·13	250	328½	
R. Hall, Sale ..	3	2	Ayrshire	Phyllis of Dunachton ..	5199	25.9.21	256	4	6,073	4·24	257·62	200	293¾	200
				Viola of Dunachton ..	5200	24.10.21	273	10	7,034	3·50	246·31	200	280¾	194
T. Harvey, Boisdale	1	1	Jersey ..	Daisy 9th of Jerseyholm ..	9392	10.12.21	273	17½	5,033	5·25	264·39	175	301½	
Dr. and Mrs. Henderson	2	Nil	Jersey											
	2	Nil	Red Poll											
W. Henderson, Grasmere	16	1	Ayrshire	Betsey 6th of Carracoorte ..	9316	28.9.21	207	4	4,041	4·42	178·81	175	203¾	
J. H. Hunter, Tyntynder Central	2	2	Jersey ..	Quality 8th of Melrose ..	6943	30.10.21	273	19½	8,008	5·66	453·22	250	516¾	320, 357
				Tiny of Tarnpirr	5172	31.10.21	273	10	6,235	5·92	369·20	250	421	386, 357, 387

CERTIFICATED COWS—*continued.*

Owner.	No. Completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.	Previous Butter Fat Records in lbs.
J. Hutchinson, Somerville	2	2	Jersey ..	Northwood Queen of Somerville	9417	25.10.21	273	18½	6,689	5·03	336·57	175	383½	
				Thana's Madeira of Somerville	9419	14.12.21	273	14	4,834	5·39	260·55	175	297	
S. A. Johnson, Woodend	2	1	Ayrshire	Bernice of La Motte ..	Not yet allotted	9.11.21	220	8½	3,594	5·08	182·48	175	208	
A. W. Jones, Whittington, near Geelong	8	5	Jersey ..	Lady Grey 12th of St. Albans	..	22.10.21	273	8½	5,089	5·94	302·46	200	344½	321
				Lady Grey 15th of St. Albans	..	12.11.21	273	20½	5,987	5·20	311·14	175	354½	
				Fuchsia of St. Albans ..	..	3.12.21	273	22	6,399	5·12	327·54	175	373½	
				Lady Grey 8th of St. Albans..	4187	21.12.21	273	8	5,917	4·49	265·82	250	303	382, 432, 459, 405, 409
				Blanchette 5th of St. Albans..	Not yet allotted	21.12.21	273	20	5,483	5·17	283·29	175	323	
	11	11	Friesian	Her Royal Highness ..	359	2.10.21	273	35	14,415	3·06	440·68	250	502½	355, 396
				Daffodil Mercena	Not yet allotted	14.10.21	273	32	12,917	3·75	481·22	200	542½	326
				St. Alban's Lady	360	27.10.21	273	24	9,289	4·07	377·92	250	430½	
				Ransome Lass 2nd	Not yet allotted	7.11.21	273	24	8,304	3·59	298·45	175	340¼	279, 328
				Beryl of Craigneil	„	7.11.21	273	19	7,930	3·70	293·55	175	334½	
				Queen Curley	„	13.11.21	273	27	11,985	3·52	421·69	200	480½	288
				May Queen 2nd	347	23.11.21	273	30	12,587	4·24	534·26	250	609	410, 519, 617, 391
				Gaiety of Craigneil	Not yet allotted	27.11.21	273	26½	7,934	3·78	99·942	175	342	
				Stately of Craigneil ..	„	2.11.21	273	20½	10,294	3·40	349·59	200	398½	274
				Westmere Inda Pietertje ..	„	15.12.21	273	24½	8,925	3·90	348·50	175	397¼	
				Buttermaid 2nd	„	23.12.21	273	24	11,287	3·92	441·92	200	503¾	311
A. Joshua, Berwick	6	5	Jersey ..	Lady Golden of Brucedale ..	..	6.10.21	273	8½	3,610	5·65	204·15	175	232¾	
				Glenida	4954	22.10.21	273	14	5,797	4·71	272·76	250	311	318
				Gaiety Girl 11th of Melrose ..	9442	22.10.21	273	8½	4,340	5·73	248·89	175	283¼	
				Silver Daisy of Terara ..	Not yet allotted	2.11.21	273	15	4,862	6·12	297·53	175	339¼	
				Mistletoe 3rd of Tarnpirr ..	9443	21.12.21	273	6	4,826	5·88	283·56	175	323¼	
G. Kent, junr., Archie's Creek	2	2	Ayrshire	Peggy of Woollamai Park ..	5275	8.10.21	269	7½	5,436	4·49	244·22	200	278½	224
				Princess of Woollamai Park ..	6478	17.10.21	273	13	5,700	4·44	252·95	175	288¼	

Certificated Cows—*continued.*

Owner.	No. Completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.	Previous Butter Fat Records in lbs.
								lbs.	lbs.		lbs.	lbs.	lbs.	
A. Kirby, Daylesford	1	Nil	Ayrshire											
Kerr Brothers, Bacchus Marsh	8	7	Shorthorn	Morven Duchess 15th ..	Not yet allotted	26.9.21	271	18	9,811	3·81	374·49	250	427	285, 350
				Morven Duchess 29th ..	,,	15.10.21	273	18½	6,335	3·91	247·45	175	282	
				Morven Daphne 14th ..	,,	16.10.21	273	19½	6,961	4·02	279·70	175	318¾	
				Morven Cresseda 2nd ..	,,	16.10.21	273	12	6,201	4·03	250·10	250	285½	236
				Morven Ruby 3rd	,,	1.11.21	273	17	6,044	4·18	252·36	175	287¾	
				Morven Daisy 7th	,,	2.11.21	273	17	6,626	4·38	289·94	175	330⅝	
				Morven Queenie 10th ..	,,	24.11.21	273	6	7,291	3·83	279·13	250	318¼	276, 272
J. A. Lang, Warrion	2	1	Ayrshire	Goodness of Roxburgh ..	3822	21.10.21	273	6½	6,697	3·95	264·38	250	301½	297
P. H. Lawrence, Agnes	1	1	Jersey ..	Nobles Morocco of Rainga ..	9456	19.10.21	273	19	5,752	4·62	265·75	175	303	
C. Lees, Lockington	8	4	Jersey ..	Bertha of Winslade.. ..	6979	6.10.21	273	7	8,316	4·56	379·28	200	432¼	
				Snowdrift of Gleneira ..	9750	5.11.21	273	15½	7,712	4·18	322·13	250	367½	
				Pansy of Gleneira	8464	6.11.21	273	11	6,508	4·32	281·27	175	320⅜	
				Aspect of Gleneira	9730	7.12.21	273	10	7,211	4·02	290·19	200	330¼	
E. M. Lennie, Tongala	4	4	Jersey ..	Primrose 2nd of Tarnpirr ..	7061	4.11.21	273	14	6,052	5·88	355·71	250	405½	212
				Tea Rose of Tarnpirr ..	Not yet allotted	14.12.21	273	18½	6,216	6·22	387·66	200	428¼	
				Starbright of Lynroy ..	9759	15.12.21	273	21½	6,527	5·60	365·36	250	416½	
				Show Girl of Tarnpirr ..	Not yet allotted	23.12.21	273	20½	6,265	5·53	346·36	175	394¾	

CERTIFICATED COWS—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard Required.	Estimated Butter.	Previous Butter Fat Records in lbs.
								lbs.	lbs.		lbs.	lbs.	lbs.	
Agricultural High School, Leongatha	1	1	Jersey ..	Sunset Star of Dunalister ..	5927	24.10.21	273	13	8,080	5·47	441·97	250	504	350, 380, 495, 469
Mrs. E. Lithgow, Lilydale	2	2	Red Poll	Plum of Corriedale* ..	Not yet allotted	12.11.21	250	4	6,264	4·76	298·14	200	340	243
				Bareena Peace		14.11.21	273	16½	5,721	4·63	264·85	175	302	
C. D. Lloyd, Malvern	9	9	Jersey ..	Gingerbread of Glen Iris ..	5197	26.9.21	273	15	7,281	5·58	406·11	250	463	309, 265, 320, 384
				Golden Fern of Glen Iris ..	6058	28.9.21	270	4	5,919	6·09	360·59	250	411	243, 332, 399
				Ryebread of Glen Iris ..	6059	1.10.21	273	8	5,150	5·06	260·61	250	297	230, 322, 293
				Fancy Bread of Glen Iris ..	Not yet allotted	2.10.21	273	7½	5,003	5·32	265·91	200	303¼	257
				White Stockings 4th ..	6062	27.10.21	161†	31½	5,986	4·42	264·73	250	301¾	405, 398, 421
				White Cake of Glen Iris ..	7112	17.11.21	189‡	19½	4,565	5·31	242·57	200	276½	291
				Rye Cake of Glen Iris ..	7111	2.12.21	273	7½	4,121	5·98	246·23	200	280¾	229
				Starbrights Princess ..	Not yet allotted	11.12.21	273	16	5,442	6·31	343·32	175	391½	
				Violas Golden Princess ..	„	22.12.21	273	11	4,869	6·20	301·91	175	344¼	
H. Luxton, Whittlesea	3	2	Jersey ..	Mary Anne of Banyule ..	6072	2.10.21	273	22½	8,405	5·07	426·22	250	486	334, 441
				Pearl 5th of Holmwood ..	6492	23·11·21	273	13½	7,827	4·83	378·23	250	431¼	339, 345
C. G. Lyon and R. R. Kerr	12	12	..	Thora 9th of Banyule ..	9510	26.9.21	273	18	4,903	5·51	270·17	175	308	
				Silvermine 22nd of Banyule ..	9505	3.10.21	273	18½	5,689	5·13	291·83	175	332¾	
				Milkmaid of Banyule ..	9497	12.10.21	273	16	6,499	4·52	293·47	175	334½	
				Lotus of Banyule	7121	14.10.21	273	14½	5,032	5·98	301·13	200	343¼	291
				Silvermine 18th of Banyule ..	6080	16.10.21	273	24½	8,096	5·55	449·13	250	512	358, 432
				Audrey Lotus of Banyule ..	9478	16.10.21	273	16	5,392	5·09	274·36	175	312¾	
				Silver Fein 2nd of Kameruka	..	21.10.21	273	20	6,403	5·55	355·27	175	405	
				Marigold of Banyule ..	9492	26.10.21	273	17	5,361	5·60	300·03	175	342	
				Harpsichord of Banyule ..	9483	29·10·21	273	27	8,358	4·77	398·38	175	454¼	
				Thora's Audrey of Elouera ..	9705	3.11.21	273	17½	5,928	5·07	300·30	175	342¼	
				Semiramis 3rd of Kameruka	Not yet allotted.	5.11.21	273	17	4,652	5·05	234·83	175	267¾	
				Machree of Banyule ..	9490	17.11.21	273	13½	4,577	6·05	276·80	175	315½	

* Previous record published under name of Plum. † Died before completing test. ‡ Sold before completing test.

Certificated Cows—*continued.*

Owner.	No. Completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.	Previous Butter Fat Records in lbs.
								lbs.	lbs.		lbs.	lbs.	lbs.	
L. McFarlane, Bundoora	10	4	Ayrshire	Peeress 2nd of Flinders ..	5407	10.10.21	273	9½	7,333	4·31	315·83	250	360	327, 336
				Beryl of Gleneira	2441	10.11.21	248	4	6,596	4·28	282·27	250	321¾	393, 359, 355
				Virtue of Ayrbrae	7565	18.11.21	273	7	4,315	4·35	187·73	175	214	
				Cher Amie 3rd of Banyule ..	6754	27.11.21	273	14	6,251	4·04	252·37	175	287¾	
W. McIvor, Moranding	2	2	Ayrshire	Foliage of Golden Vein ..	5423	7.12.21	273	18	6,392	4·34	277·62	200	316½	
				Edith of Golden Vein ..	5419	19.12.21	235	4	5,458	5·06	276·23	250	315	
W. J. McKernan, Tatura	1	1	Ayrshire	Hazel of Locheden	10014	14.10.21	273	16	5,946	4·65	277·65	175	316½	
R. Maher, Wyuna South	1	1	Jersey ..	Pansy of Rosemont ..	..	9.10.21	273	13½	4,826	5·33	257·09	175	293	
P. J. Maloney, Tongala	4	4	Jersey ..	Lady of Belgonia	Not yet allotted	26.9.21	273	8	5,625	5·27	296·32	200	337¾	243
				Bonnie of Belgonia ..	9549	1.10.21	273	14	6,084	5·49	334.24	175	381	
				Beauty of Belgonia ..	9548	7.10.21	273	16	7,738	5·16	399·76	175	455¾	
				Marie of Bonshaw	7171	1.11.21	273	14	8,015	4·58	367·31	250	418¾	241, 297
W. Meredith, Ondit	2	Nil	Ayrshire											
T. Mesley, Dalyston	3	3	Jersey ..	Peggy Pride of Warenda ..	Not yet allotted	9.10.21	273	13½	4,435	6·72	298·08	175	339¾	
				Namesake 2nd	5251	13.10.21	273	23	7,726	4·92	379·95	250	433¾	
				Florrie of Warrenda ..	7190	4·12·21	257	5	4,975	5·76	286·77	200	327	
D. C. Miller, Agnes	2	2	Jersey ..	Ruby of Tarnpirr	Not yet allotted	8.10.21	273	18	5,703	5·08	289·78	175	330¼	
				Model of Kirkhill		24.10.21	273	10	4,417	5·53	244·12	175	278¼	

CERTIFICATED COWS—*continued.*

Owner.	No. Completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.	Previous Butter Fat Records in lbs.
H. J. Munro, Casterton	2	2	Ayrshire	Doris of Glencourt	6636	25.9.21	273	lbs. 7	lbs. 7,066	4·17	lbs. 294·35	lbs. 250	lbs. 335½	
				Elsie of Glencourt	7543	24.10.21	273	10½	6,146	3·85	236·33	200	269½	
Mrs. Lilian Orchard, Graham Vale	5	2	Jersey ..	Tulip of Jerseyvale ..	Not yet allotted	12.10.21	273	9½	5,150	5·05	260·18	200	296½	
				Rose of Jerseyvale		16.11.21	273	9½	4,026	4·91	197·86	175	225½	
T. H. Payne, Kilmore	4	4	Red Poll	Chance	217AA	6.10.21	273	5	6,368	3·96	252·06	250	287½	234
				Daffodil	483E	7.10.21	248	4	6,570	4·72	309·95	250	353½	357
				Gratis	218AA	8.11.21	273	11	6,799	4·17	283·80	250	323½	325
				Plumstead Permain	219AA	15.12.21	273	20	6,401	4·26	272·89	200	311	
H. Perdriau, Werribee	2	1	Ayrshire	Beauty of Quarry Hill ..	10135	9.10.21	273	6	6,124	5·02	307·46	250	350½	
J. Phillips, Murraydale	1	1	Jersey ..	Jessie 11th of Ferntree Vale..	Not yet allotted	27.10.21	273	16	8,616	4·46	383·87	200	437½	296
J. Platfuss ..	2	2	Friesian	Monavale Juno Paxton ..	169	29.10.21	273	29	11,913	3·34	398·47	200	454½	326
				Westmere Oakwood Duchess	Not yet allotted	3.11.21	273	33	10,319	3·34	344·95	175	393¼	
R. Ralston, Mogloneemby	4	3	Ayrshire	Crissie of Willow Vale ..	6736	10.10.21	273	11½	5,521	3·80	209·66	175	239	
				Veronica of Ben Kell ..	5755	23.10.21	273	8½	5,305	4·06	215·15	200	245½	212
				Adella of Ben Kell	5745	29.10.21	273	10½	5,497	4·12	226·48	200	258¼	
Miss Bruce Reid, Bundoora	8	1	Jersey ..	Mauve Lilac of Kamaruka ..	7349	3.12.21	273	9	4,757	5·79	275·54	250	314¼	342, 292

CERTIFICATED COWS—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.	Previous Butter Fat Records in lbs.
C. J. Reid, Devenish	1	Nil	Jersey											
Miss S. L. Robinson, East Malvern	2	2	Jersey	Golden Betty	7227	4.12.21	273	20	6,054	4·26	257·98	250	294	
				Kyora's Velveteen ..	Not yet allotted	9.12.21	273	16	4,779	5·13	245·11	175	279½	
J. H. Rogers, Yarraville	4	3	Ayrshire	Ella of Ellerslie	4392	23.10.21	273	11½	7,083	3·83	271·18	250	309¼	
				Bonnie of Glencairn ..	5640	24.10.21	273	20	8,567	3·64	311·48	250	355¼	203, 296
				Daisy of Bundara	4258	24.11.21	252	4	6,919	4·25	294·00	250	325½	393, 450, 454
G. Rowe, Kardella	6	4	Jersey ..	Sweet Pansy 5th of Melrose	7400	4.10.21	273	16	5,401	6·71	362·42	250	413¼	245, 311
				Rosette of Hillcrest	Not yet allotted	10.10.21	273	13½	5,171	4.75	245·60	175	280	
				Joy of Hillcrest	„	19.10.21	273	8	3,741	5.49	205·41	175	234½	
				Pattie of Hillcrest	„	3.12.21	273	10	4,356	4·69	204·41	200	233	207
S. Russell, Tongala	2	2	Friesian	St. Alban's Lily	362	10.10.21	273	17	8,142	3·23	263·31	200	300¼	
				Springfield No. 9	Not yet allotted	23.10.21	273	32½	9,824	3·63	356·82	175	406¼	
F. Sadler, Camperdown	7	4	Shorthorn	Roan Ada 4th	Not yet allotted	14.10.21	273	20½	7,275	3·45	251·03	250	286¼	300, 280, 303
				Pearl Red 28th	„	5.11.21	273	18½	5,476	4·06	222·46	175	253¼	
				Diana 6th of Braelands ..	„	9.11.20	273	17½	8,222	3·96	325·84	250	371½	393
				Red Pet	„	12.11.21	273	9	6,443	4·18	269·12	250	306¾	343, 287
Sadler Brothers, Noorat	8	5	Ayrshire	Pearl of Burnbrae	4620	29.9.21	273	22	8,975	4·24	380·68	250	434	343
				Celia of Burnbrae	4608	17.10.21	273	7	6,518	4·02	262·23	250	299	247
				Laurel of Burnbrae ..	4615	24.10.21	260	4	6,954	3·92	272·67	250	310¾	285, 317
				Greta of Burnbrae	6844	6.12.21	273	21	6,725	3·90	262·17	250	298¾	246
				Patricia of Kilmarnock ..	10278	8.12.21	273	12	5,550	3·80	210·67	175	240¼	

CERTIFICATED COWS—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.	Previous Butter Fat Records in lbs.
								lbs.	lbs.		lbs.	lbs.	lbs.	
Agricultural High School, Sale	2	2	Ayrshire	Gladiana of La Trobe ..	4809	25.9.21	273	6½	4,678	5.21	243·69	200	277¾	221
				Gladys of Ellerslie	4810	15.10.21	273	7½	5,979	4·47	267·56	250	305	295, 253
A. H. Schier, Glen Forbes	20	11	Ayrshire											
				Madeline of Inverleigh ..	5856	26.9.21	273	5	4,562	4·44	202·66	200	231	
				Dolores 2nd. of Banyule ..	10286	27.9.21	273	7	3,892	4·62	179·71	175	204¾	
				Snowdrop of Inverleigh ..	5865	29.9.21	273	4	6,322	4·32	273·13	200	311¼	221
				Pearl Queen of Wethersdane	7452	1.10.21	273	4½	5,314	4·01	213·28	200	243½	241
				Profit of Roxburgh ..	6330	7.10.21	260	4	5,604	3·61	202·24	175	230½	
				Milkmaid of Inverleigh ..	5859	12.10.21	256	4	5,688	3·91	222·44	200	253½	
				Queen of Scots 2nd of Banyule	10290	17.10.21	257	4	4,628	4·66	215·78	175	246	
				Boronia 2nd of Pine Grove ..	4626	3.11.21	273	5	5,727	4·86	278·52	250	317½	269, 226, 281
				Gold Point 2nd of Banyule ..	10288	10.11.21	273	7½	4,730	4·74	224·38	175	255¾	
				Modesty of Inverleigh ..	5861	16.12.21	273	19	6,576	3·76	247·09	200	281¼	223
				Fine Quality of Gleneira ..	7711	18.12.21	273	9½	4,557	4·37	209·26	200	238½	187
J. Scott, Chiltern ..	3	3	Jersey ..	Irish Flavour of Eloura ..	9700	3.10.21	273	14	4,911	5·43	266·54	175	303¾	
				Irish Eyes of Eloura ..	9699	4.12.21	273	15	3,870	6·21	236·28	175	269¼	
				Cora 2nd of Havilah ..	6064	25.9.21	261	4	6,082	4·91	298·48	250	340¼	320, 361
Mrs. E. Sims, Toolern Vale	1	1	Jersey	Marie of Tarnpirr	6029	19.10.21	273	5½	4,875	5·95	290·19	250	330¾	282, 266
O. J. Syme, Macedon	6	5	Friesian	Jennie de Kol	301	30.9.21	273	24½	10,571	3·48	368·00	250	419¼	348, 400, 319
				Duplicate Posch Maud ..	300	9.10.21	273	7	13,665	3·42	466·75	250	532	391, 348, 420, 365
				Bolobek Dora	345	16.10.21	273	20	8,073	3·87	312·44	175	356½	
				Colantha Curley Segis ..	Not yet allotted	22.10.21	273	9½	8,336	3·62	301·95	175	344½	
				Bolobek Edith	337	31.10.21	273	25	8,545	3·77	322·45	200	367½	

CERTIFICATED COWS—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.	Previous Butter Fat Records in lbs.
								lbs.	lbs.		lbs.	lbs.	lbs.	
J. R. Telford, Kyabram	5	5	Ayrshire	Cora of Hyde Park	5997	12.9.21	273	5½	4,480	5·05	226·06	200	257¾	
				Adora of Fern Hill	5924	6.10.21	273	15	8,258	4·22	348.58	250	397½	
				Countess of Byrneside ..	5998	20.10.21	273	4½	7,471	4·16	310·90	250	354½	
				Dolly 4th of Glengowrie ..	5999	21.10.21	273	22½	8,492	4·42	375·64	175	428½	
				Pearlie of Hyde Park ..	6919	30.11.21	273	9½	5,536	4·68	258·98	175	295¼	
W. Tendeson, Merrigum	2	2	Jersey ..	May Queen of Brookside ..	9722	14.11.21	273	20½	8,026	4·36	349·94	200	399	
				Silvermine of Brookside ..	9724	18.12.21	273	6	5,439	5·29	287·56	250	327¾	
J. H. Thorburn, Woodend North	3	3	Ayrshire	Jean of La Motte	6014	26.9.21	248	4	5,536	4·14	228·93	200	261	
				Oatland's Beauty	6927	28.9.21	273	4	4,147	4·71	195·13	175	222½	
				Oatland's Maggie	6928	5.11.21	225	4	4,615	4·44	205·14	175	234	
F. Trevaskis, Tongala	1	1	Jersey ..	Romany Girl 2nd of Tarnpirr	7062	14.10.21	273	8	5,145	5·44	279·90	200	319	243
J. T. Tweedle, Sunbury	8	8	Friesian	Ashlynn 25	Not yet allotted	7.10.21	273	23	8,705	3·36	292·29	200	333¼	
				Ashlynn 52	,,	25.10.21	273	11½	6,803	3·86	263·16	175	300	
				Jessie Fobes Homestead of Oakview	,,	29.10.21	273	13	6,682	3·75	250·40	175	285	
				Ashlynn 56	,,	1.11.21	273	10	6,565	3·87	253·78	175	289½	
				Ashlynn 57	,,	2.11.21	273	16½	7,667	3·53	270·59	175	308½	
				Ashlynn 33	,,	1.12.21	273	18	7,494	3·69	276·62	200	315½	
				Rosevale Jessie Posch ..	,,	4.12.21	272	24	10,829	3·27	353·62	175	403½	
				Rosevale Rosie Abbekirk ..	,,	7.12.21	269	22½	11,398	3·05	347·42	175	396	
G. Vallence, Bacchus Marsh	2	1	Ayrshire	Ruby of Banyule	6792	6.10.21	273	11	6,577	3·76	247·37	200	282	
W. M. Vale, Woodside, near Yarram	2	1	Jersey ..	Lady Pattie of Ferndale ..	Not yet allotted	11.11.21	273	12½	6,377	5·30	338·12	200	385½	259

CERTIFICATED COWS—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Butter.	Previous Butter Fat Records in lbs.
								lbs.	lbs.		lbs.	lbs.	lbs.	
G. Waite, Werribee	4	4	Friesian	Countess of Ashby ..	326	1.11.21	273	24½	7,792	3·29	256·26	250	292½	
				Satsuma	459	8.11.21	245*	12	6,086	3·68	225·12	200	256½	
				Countess 3rd of Ashby ..	Not yet allotted	29.11.21	273	16	7,731	3·23	250·00	175	285	
				Japana	461	5.12.21	273	..	7,207	3·52	253·83	200	289½	
A. L. Walter, Little River	2	2	Jersey ..	Rosebud of Tarnpirr ..	4210	29.9.21	273	17	6,228	5·71	355·87	250	405½	276, 377, 347
				Postcard of Tarnpirr ..	5167	6.11.21	273	13	5,869	6·21	364·29	250	415½	338, 342
Agricultural High School, Warrnambool	2	Nil	Ayrshire											
H. L. Webb, Sunbury	4	4	Ayrshire	Milkmaid of Holly Green ..	6045	14.10.21	273	19	7,959	3·73	297·02	250	338½	
				Narcissa of Blackwood Park..	4777	24.10.21	273	13	6,730	4·11	276·85	250	315½	
				Empress of Holly Green† ..	6042	30.10.21	273	18	6,110	4·31	263·17	200	300	
				Melba of Holly Green ..	6952	4.11.21	273	13½	4,969	4·43	220·23	175	251	
J. Wills, Bacchus Marsh	1	1	Friesian	Bolobek Janet	340	8.10.21	255	4	9,778	3·58	350·40	200	399½	
W. Woodmason, Murrumbeena	8	8	Jersey	Jessie 24th of Melrose ..	Not yet allotted	29.9.21	273	17	7,251	5·84	423·74	200	483	311
				Pearl 10th of Melrose ..		10.10.21	267	8	4,445	6·13	272·49	175	310½	
				Gaiety Girl 10th of Melrose ..		6.10.21	273	18	5,940	6·21	368·70	200	420½	276
				Jessie 15th of Melrose ..	5546	22.10.21	273	16½	5'810	5·86	340·26	250	388	270, 326, 351, 361, 356
				Jessie 22nd of Melrose ..	Not yet allotted	2·11·21	273	15½	5'288	6·20	327·93	250	374	348
				Rarity 7th of Melrose ..	5559	11.11.21	273	15½	7'510	4·76	357·61	250	407½	254, 325
				Jessie 21st of Melrose ..	9885	12.11.21	273	15½	5'977	5·83	348·33	250	397	
				Graceful Duchess 11th of Melrose No. 1	6981	10.12.21	273	22½	6'971	6·21	433·03	250	493½	370, 538, 506, 460

* Sold before completing test. † Entry deferred three weeks—calving trouble.

GEELONG FARM COMPETITION.

Conducted by Geelong Agricultural and Pastoral Society.

Report of Judge, H. A. Mullett, B.Ag.Sc., Chief Field Officer.

The principal function of an Agricultural Society is to foster agricultural progress in the rural community. But in many cases Victorian Societies do little more in that direction than hold their Annual Shows. Properly conducted, the Agricultural Show is undoubtedly a valuable educational medium, but in the increasing tendency towards excessive development of side-shows and novelties there is a real danger of the original purpose of the Shows being subordinated. When a Society permits its side-shows to grow at full proportion to the agricultural exhibits, then it reduces itself to the level of concerns which exist to make money out of amusement.

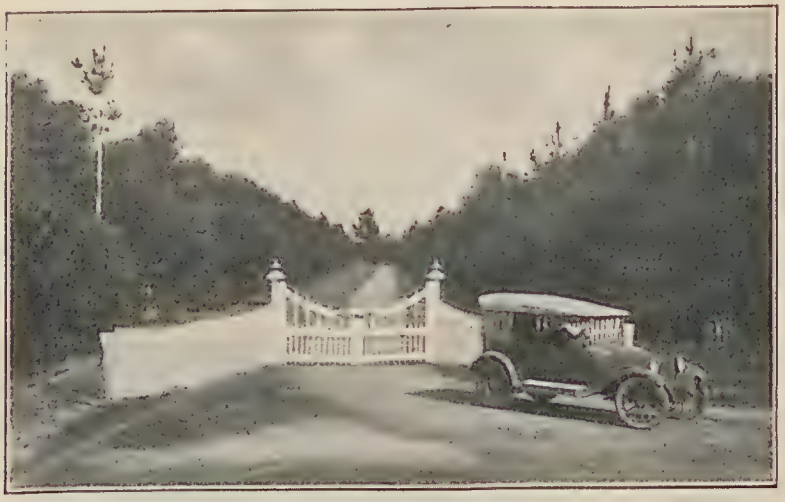
"Springfield Avenue," Moolap.
Comfortable farm home of Mr. D. O'Halloran—winner, Large Farm Section.

Fortunately, within recent years a number of the Societies have not overlooked their true function, and have endeavoured to maintain a reasonable balance between the purely profit-earning part of their work and the educational. The reorganized Geelong Agricultural and Pastoral Society is one of these. New educational features added to their schedule this year are Farm Competitions, and Boys and Girls' Calf and Pig Clubs. The results obtained have certainly justified the effort.

The Aim of the Competition.

In the Farm Competition, with which this report is alone concerned, there were three classes—(A) for farms of 100 acres and over, (B) for farms of under 100 acres, (C) for farms owned by returned soldiers settled under the repatriation scheme. The object is to promote better farming methods, good farm management, more effective improvements, and to secure improvement in the farm environment generally,

by means of the healthy rivalry generated by competition and example. There were eleven entries, comprising seven in Class A, one in Class B, and three in Class C. The quality of the competing farms was so good and the interest excited so keen that it will be surprising if Geelong



The Drive at "Grassdale."
Awarded second prize—Large Farm Section. (Property of Executors of late F. J. Leary and E. E. Hendry.)

Judging "Grassdale."
Representatives of Geelong Agricultural Society and the Press. Mr Ham, President of the Society, in the centre.

farming does not benefit as a result of the powerful fillip it has received.

The District.

From a soil, climatic and market point of view Geelong is a favoured district. The rainfall ranges from 22 inches annually on the high

volcanic plain to 25 inches in the Moriac and Buckley districts. The greater part of the land to the north and east is plain liberally sprinkled with volcanic floaters and "stony rises." But the soil is a retentive clay capable of growing good crops of wheat and barley, and is unequalled for oaten hay. To the south and west—that is, nearer the sea coast—the land is more undulating, and consists of sandy loam overlying clay. Here oats, barley, dun peas, and certain artificial grasses and clovers have been shown to thrive on what was once looked upon as merely grazing country. These elevated areas are intersected by the Barwon and Moorabool rivers and their tributaries. Great valleys have thus been carved out. They contain rich flats and slopes. Their fertility has largely been contributed to by the volcanic soils eroded by the rivers, and by the extensive beds of limestone cut through. Between the Barwon and the Moorabool lie the Barrabool hills, with their rich chocolate volcanic soils, but they are a thing apart from the volcanic plains, as also are the friable black volcanic loams which fringe the sea coast in the Moolap district. It is on the river flats, on the Barrabool hills, and at Moolap and Moriac that the greatest agricultural development has taken place. In these areas the more intensive types of farming may be practised.

If there are any outstanding impressions of a week's critical inspection of the farms in the Geelong district they are these—the highly improved farm environments seen, especially in the planting of trees and hedges, the thoroughly diversified character of the farming practised on individual farms, the extensive use of dun peas as a catch crop and as a soil renovator, and the excellent results that attend the planting of subterranean clover and lucerne in the moister parts of the district. Further than that, most of the live stock noticed, except draught horses, were high class.

Judging the Competition.

The farms were judged on a scale of points prepared by the Geelong Society. Full details of these are shown at the head of the tabulated list of marks awarded. Because there were not sufficient entries to warrant further subdivision of the classes, dairy farms had to be measured by the same standard as cereal and sheep farms, with attendant difficulties in making fair comparisons. The result was that farms with the greatest diversification scored most consistently, and were able to beat less diversified farms where individual items such as live stock, &c., were often very meritorious and really worthy of greater consideration than the scale of points allowed. In future, however, the Geelong Agricultural Society will no doubt see to it that, provided there are sufficient entries, further subdivisions of the classes are made.

Awards.

Mr. D. O'Halloran secured 232 marks out of a possible 310 in Class A. He is therefore placed first. The Executors of the late Mr. F. J. Leary and Mr. E. E. Hendy were awarded 229 points and second place with their Grassdale entry. Then follow Mr. W. J. Muhleback, 225; Mr. R. Purnell, 224; and Messrs. Leigh Bros., 204.

In Section B, Mr. J. J. Baker—whose entry was the only one received—was awarded 190 points and first place.

DETAILS OF AWARDS.

—	Farming Methods.	Crops and Sown Grass.	Fallow.	Horses.	Sheep.	Cattle.	Pigs.	Poultry.	Plant and Implements.	Subdivision Fences, Gates.	Orchard and Vegetable Garden.	Water Supply.	Fodder Reserves.	Tree Planting.	Insurance.	Home and Buildings.	Total Points.
Possible Points	**35**	**20**	**20**	**25**	**20**	**25**	**15**	**10**	**20**	**20**	**10**	**20**	**20**	**20**	**5**	**25**	**310**
Section A—(Farms 100 acres and over).																	
D. O'Halloran	30	19	14	24	12	16	8	6	13	19	4	17	7	19	4	20	232
Executors late F. J. Leary and E. E. Hendy, "Grassdale"	30	18	16	19	13	11	1	6	17	16	6	15	18	20	4	19	229
W. J. Muhlebach	24	14	7	24	12	25	11	4	17	18	10	12	13	9	4	21	225
R. Purnell	27	12	13	15	15	18	12	5	15	13	3	18	15	18	5	20	224
Leigh Bros.	25	18	11	21	18	9	7	8	10	13	4	10	15	12	3	20	204
Executors late F. J. Leary and E. E. Hendy, "Woodlands"	25	15	13	18	5	8	5	5	13	17	6	14	16	19	3	20	202
S. J. Lugg	23	17	8	16	17	9	5	7	16	12	3	10	5	8	2	17	175
Section B—(Farms less than 100 acres).																	
J. J. Baker	25	16	5	16	0	20	15	9	15	16	5	18	5	7	2	16	190
Section C—(Farms settled by Returned Soldiers under Repatriation Scheme).																	
G. W. Evans	24	13	13	12	12	7	10	7	13	14	0	11	2	7	3	13	161
L. C. Kelly	26	19	7	17	0	8	0	0	13	12	4	9	10	1	3	14	143
B. Maddox	26	17	7	14	0	14	6	5	9	6	3	5	5	5	4	10	136

In Section C, Mr. G. W. Evans secured 161 points and first place, and Mr. L. C. Kelly, 143 points, was second.

Mr. D. O'Halloran's winning farm, "Springfield Avenue," is located at Moolap, some 5 to 6 miles south of Geelong. It comprises 449 acres of undulating country on the shores of Reedy Lake. The soil is a good quality sandy loam of dark colour. This farm won by its consistent scoring under every head for which marks were allotted.

It was very evident that the property is soundly managed and is a profitable investment to the owner. Mr. O'Halloran is a specialist in dealing in dairy cattle. He has been conducting his present business for fifty-three years. His reputation as a judge of the utility dairy cow is second to none in the Western District. It is his practice to buy the cows and then bring them into profit on his farm before selling them; beside that, he maintains a small permanent dairy herd of grade cows.

One of Mr. O'Halloran's grade cows, showing good dairy points.

The whole farm—its lay-out, subdivision, and the system under which it is being farmed—is organized for the particular business of the owner. There are twenty-six small paddocks, no one of which is greater than 36 acres. Great care has been taken in laying them out to have them accessible to each other, to water, to the farm yard, and to the drafting pens. A cropping system has been devised which provides for ample areas of luscious pasture, which is productive during a longer period of the year than usual. This is done by sowing down a liberal admixture of lucerne with the English rye grass. They are also top-dressed.

A feature of the place is the magnificent plantings of trees and hedges (kept well trimmed) which form the shelter belts about the paddocks and homestead. The home and farmstead are located on rising ground at the head of a broad, straight drive planted with

massive pines and well-grown sugar gums. From here the land slopes gently away on all points of the compass, and a view is commanded of nearly every paddock.

The farm buildings, stable, barn, cow-shed, pigsties, and implement-sheds, &c., are neatly and conveniently arranged behind the house, and are surrounded by planted lanes which give access to the various paddocks on to the entrance drive. The public water supply is tapped at the road. The farm buildings and garden are served through pipes from a large dam, about 2,000 cubic yards, by windmill and tank. In all there are six dams and water-holes. The fencing, 13 miles in length, and the fifty or sixty wooden gates were first-class.

The entire boundary fence was of unusually stout construction. The box posts were interspersed with two heavy galvanized droppers. There were four galvanized plain wires and two barbed. The wire was of a gauge many times stouter than that ordinarily used, and was tightly strained and thoroughly well anchored.

Working horses of good stamp. (Mr. D. O'Halloran's, Moolap.)

Besides the dairy-herd of eighteen grade cows in milk, eighty other dairy cattle were being carried. In addition there were fifty sheep, four pigs, and eleven horses. The horses were considered equal to the best seen in the Competition.

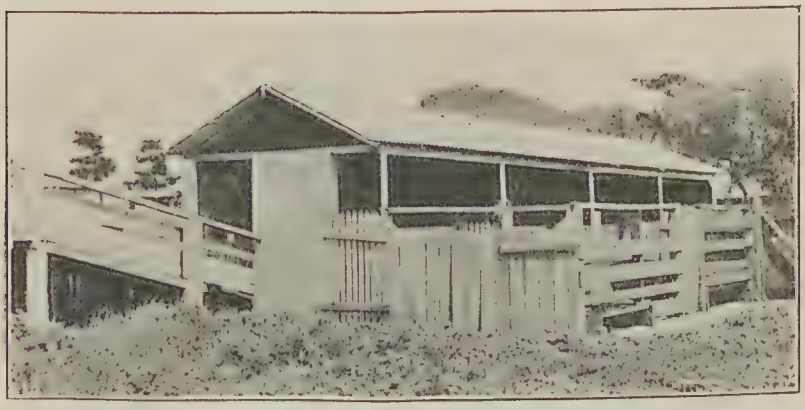
On this property from 80 to 100 acres are cropped each year, the balance being fallow or in grass, of which from 60 to 70 acres are under artificial grasses in full vigour, and a considerable portion of the remainder of the pasture showed evidence of having been sown down at some time. As a rule 60 acres are sown to Pryor malting barley, 30 acres to Algerian oats for hay, 15 acres to Currawa wheat for grain, and there are from 30 to 40 acres of fallow. The system followed is to sow oats for hay on the fallowed land, then seed barley on the oat stubbles or after the wheat. When it is desired to spell the paddock, one bushel of rye grass is sown with the barley crop. In the following year the stubbles are harrowed after the first rains and dressed with 3 to 4 lbs. of lucerne with 1 cwt. of superphosphate. The result, as evidenced by the pastures seen, is very profitable on this class of country. They were rich with burr clover among the

rye grass, while a plentiful admixture of lucerne could be seen which should be useful during the summer months.

Mr. O'Halloran top-dressed 23 acres with superphosphate at the rate of 1 cwt. per acre this year. The resultant growth fully justified the outlay. In addition, liming with shell lime from the shores of Reedy Lake is practised, 380 acres having been treated at the rate of forty loads per acre during the past forty years.

The shell is carted to the land in drays and spread by means of a land grader. From £2 per acre—the cost years ago—the cost has risen to £6 to £8 per acre now. The growing crops of wheat, oats and barley shown looked excellent.

The property of the executors of the late F. J. Leary and E. E. Hendy challenged the winner (D. O'Halloran) strongly in each branch. The farm consists of 1,040 acres of undulating loamy soil at Moriac. During the past seventeen years it has been developed from the rough in a most courageous way by the present owners. To-day it is a magnificently improved property, carefully subdivided, well provided



Convenient pig-styes, with loading-race, at Mr. O'Halloran's farm.

with water, and liberally planted with fine shelter belts of sugar gums and *pinus insignis*. In all there are five and a half miles of well-grown shelter belts on the property. As an effort to improve the farm environment it compares favorably with anything that has been done in the State. The homestead is approached through a planted drive, as are each of two comfortable workmen's cottages located in other parts of the farm.

Along with a number of others, including Messrs. Deppler Bros., Mr. R. Purnell, the late Mr. N. Morrison, and Mr. John Hunt, the proprietors of "Grassdale," have carried out a considerable amount of experimental work at Moriac. They succeeded in demonstrating that fine crops of oats, barley, dun peas, and lucerne can be grown, and that subterranean clover thrives. The following areas on "Grassdale" are cropped annually:—Oaten hay, 200 to 220 acres; barley, 30 acres; dun peas, 100 acres; there are also 8 acres of lucerne and 224 acres of subterranean clover. The balance of the area is in natural grass and fallow; an area of 174 acres has been fallowed this year with the mould-board plough. The rotation system practised is to precede the

cereal crops either with a fallow or with dun peas. The peas are usually grown on fallow. On much of the fallow a "catch" crop of millet is obtained. For hay 2 to 2¼ bushels of Algerian oats are used with 100 lbs. of superphosphate. The seeding is done in April and May.

For barley 2 bushels per acre are used with 100 lbs. of superphosphate; 3 bushels per acre is the rate of seeding preferred for dun peas, with 100 lbs. of superphosphate. The method of sowing the subterranean clover is either to plough up stubbles and sow at the rate of 4 lbs. per acre, or to seed with a cereal crop in April. The latter practice gives the best results. A remarkable instance of this was noticed in one of the fields during the inspection.

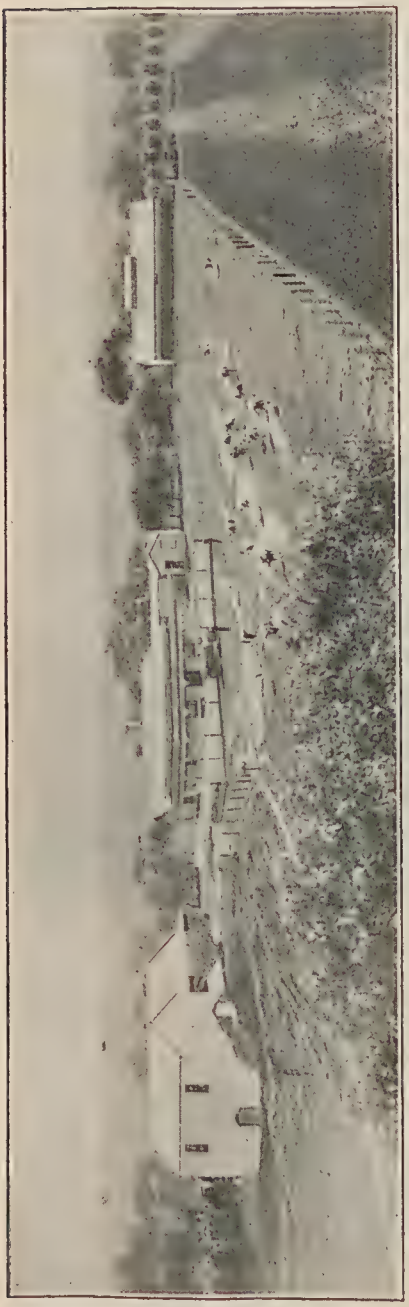
There are very few properties where such extensive plantings of subterranean clover have been made. This hardy plant has proved invaluable at "Grassdale" in improving the carrying capacity of the

Heavy crop of Barley at "Grassdale."

resting paddocks. Its prolificacy could be still further enhanced by top-dressing with superphosphate, or better still with superphosphate and marl in conjunction. On "Woodlands," a sister property of 775 acres, 100 acres have been "marled" at the rate of 100 loads per acre from a fine marl pit on the property. The marl was dumped in heaps about five yards apart and spread by driving a land grader of the louvre type across in two directions at right angles. The contract price was 1s. 3d. a load, plus the cost of spreading.

The beneficial effect of the marl could be noticed in the subsequent crops, and in particular is the carrying capacity of the paddock, when spelled in grass, greatly increased. On both these properties it is the practice to buy the sheep as stores and then fatten them. At the time of judging, "Grassdale" was carrying 300 comeback ewes and lambs, and "Woodlands" was temporarily without sheep.

Dun peas are found a very payable crop. The average yield is about eight bags per acre, but up to ten bags are occasionally obtained. In



Homestead of Mr. W. J. Muhlebach. Third, Large Farm Section. (Cow-shed on the right; barn and cellar on the left.)

harvesting, the practice adopted is to rake the peas into rows, cure and cart them to the thresher direct. The waggons keep the machine fully employed, hence stacking charges, &c., are avoided. A feature of both properties was the provision of a number of mouse-proof hardwood stack stands, each capable of holding 80 to 90 tons of hay. In these, the spaces between the bearers was covered with wire netting in lieu of hardwood planking. At "Grassdale," there was a silo as well. Neat stacks of pea straw were noticed. The fodder reserves were adequate, the farm buildings solidly constructed, and the water-supply system satisfactory. Most of the crops looked well, some even a trifle rank. The fallow on "Grassdale" was well ploughed, but that on "Woodlands," which had been disked, was not so satisfactory. "Woodlands" and "Grassdale" each had 3½ acres of well-kept orchard.

Another property of undoubted merit was that of Mr. Muhlebach, "Retreat," Batesford. This farm of 284 acres is most picturesquely situated on the rich Moorabool flats. From the steep terraced slopes a couple of hundred feet high, which forms the northern boundary, a comprehensive view of the farm could be obtained. Immediately below the eye, 32 acres of evenly grown and exactly planted apples, pears, apricots stand out boldly against a background of perfectly tilled soil. From either side of a straight drive, paddocks of oats, barley, grass, lucerne are laid off squarely, and here and there groups of sleek dairy cattle and well-grown sheep may be seen. In the distance are grouped the boldly modelled farm buildings. The winding Moorabool with its shady trees flanks the whole of the southern boundary.

Besides its profitable orchard, this farm is also noted for its pedigree Ayrshire dairy cattle, and for some excellent pigs. The Ayrshires comprise 22 pure-bred cows, 10 calves, and 2 pure-bred bulls. At present, seven are in milk, and are undergoing the Government herd test. The head of the stud is Violet's King—a shapely animal with all the dairy points. He was second as a yearling at the Royal Show and first as a year-old. A yearling bull by him was awarded first place at the Royal Show last year.

The cows were in perfect condition, and are well housed in 14-bail cow-shed, 60 feet x 24 feet, with the stalls in a single row. The floor is paved with brick, and well drained. The shed faces east, and the boards on this wall are spaced to permit entrance of plenty of light. There is ample space behind the stalls for storing feed, and the mixing room is conveniently situated. An adequate supply of flushing water is available. The cows graze the natural pastures, and in the autumn

One of Mr. Muhlebach's pedigree Ayrshires.

have access to oats and barley forage, specially grown for them. In the summer, lucerne is available, and this year 10 acres of Wimmera rye grass has also been laid down for forage purposes.

There are some 20 acres of lucerne sown on the land nearest the river, that is, on the richest portion, also about 130 acres of cereals and forages, including 82 acres of oats, 18 acres of Federation wheat, 30 acres of barley, and 1½ acres of mangels are grown annually. Fallowing is not practised here, nor are peas now grown. A powerful steam pumping plant has been installed for irrigating the lucerne during the summer. For this the canvas hose system is adopted.

In all, there were about 560 Comeback ewes of excellent type, with lambs, most of which were in prime condition. They had been mated with Border Leicester and with English Leicester rams. Mr. Muhlebach proposes to give the Dorset Horn rams a trial. These will be thoroughly tested against the Border Leicester and the Shropshires.

As a rule, 400 ewes are lambed down here. Some points were deducted for the presence of foot-rot, otherwise these were the best sheep in the Competition.

The pigs consisted of three pedigreed Yorkshire and one Berkshire sows of good type. The litter and urine from the sties had been carefully preserved in a pit for use on the farm crops.

The Clydesdale draught horses seen showed evidence of quality, and were big active sorts. On the whole, the quality of the live stock on the place was the best in the competition.

Despite the high degree of specialization in the live stock, the principal source of revenue on "Retreat" is the orchard. This is laid down on good loamy land, but by no means the richest on the property. Besides the 32 acres in one block, there are 4 acres of recent plantings near the two homesteads. There are 2 acres of pears—"Ironbark" (Black Ackan), Prince William, and Packham's Triumph; 3 acres of apricots, of which Mansfield's Seedling are best; and 2 acres of plums.

The head of the dairy herd at "Retreat," Batesford.

The balance is in apples, principally Jonathan, but there are also Delicious, Cleopatra, Rome Beauties, &c. The orchard was very evenly grown, and the trees shaply and well developed. Great care is given to the tillage between the trees, to pruning, to manuring, and to provision for free cross-fertilization of the apples. In the autumn of each year, a barley and oats mixture is sown between the trees and fed off to sheep. This acts as a green manure. The residues are carefully ploughed under in mid-August, and from then on the soil is repeatedly worked with a spring-tooth cultivator, the "Harvey" cultivator being used to get close to the trees. Originally, considerable plantings had been made to the Horn variety of apple, and as these went out of favour, further Jonathans were grafted to the old stock. It was observed that there was a marked decline in the yields of trees in the vicinity, and especially to the windward of the new graftings. This led Mr. Muhlebach to experiment with methods of cross-fertilizing. The

system now found most satisfactory after considerable testing is to graft a small branch of Cleopatra or New York to every nine Jonathans. The advantages of this were discovered by placing a cut branch of these varieties in certain trees at flowering time. There was an immediate increase in yield in the surrounding trees. Mr. Muhlebach considers that it does not pay to rush trees into bearing quickly. His trees have been well cut back, and are surprisingly free of surplus wood, and show prolific development of fruiting wood. By these methods the satisfactory yield of between 4,000 to 6,000 cases is obtained. The planting

Portion of Mr. Muhlebach's "Retreat" dairy herd watering in the Moorabool River.

Some good comeback ewes at "Retreat."

is on the basis of 106 trees per acre. Before planting, the land was subsoiled to 18 inches deep.

The homestead is an attractive one, well provided with modern labour-saving devices. A feature of the farm buildings is a large barn with cellar.

"Narrawong," 360 acres, at Moriac, the property of Mr. Robert Purnell, is another highly developed and well-managed farm. The

same provision to extensive belts of shelter and shade trees that were so marked a feature in the two leading farms in this section was noticed here. The house is a modern bungalow, with attractive garden, broad planted drive, bordered with neat fencing. The water supply was superior to any seen on any of the other farms. There are three large dams; the principal is about 2,500 cubic yards capacity; it is equipped with an 8-ft. mill on a 30-ft. tower. The water from a 3,000-gallon tank on a 10-ft. stand is piped to stable, dairy, pigsties, garden, orchard, troughs, and supplements; the rain-water supply goes to the house.

The original object of this farm was to spell the working horses from Mr. Purnell's Geelong carrying business, but gradually a well-balanced farm has been evolved. To-day, the horses, while picking up condition and resting their legs from the effects of macadamized city roads, are utilized profitably in the growing of hay, peas, barley, and lucerne. Further, a number of remounts and lorry horses are bred. A

Attractive bungalow residence and planted drive of Mr. R. Purnell, "Narrawong," Moriac.

pedigree Jersey herd has been installed, and a stud of Yorkshire pigs has been got together.

As a rule, 100 acres are sown to oaten hay, either after bare fallow or dun peas, of which 25 acres are sown. This year, however, Mr. Purnell has made extensive plantings of peas, up to 100 acres, on an adjoining property. Twenty acres of Cape barley are sown for grain for the pigs, and 25 acres are down in lucerne. This latter can be irrigated to some extent from the main dam, if necessary. In all, some 45 acres are down in sown grasses, including subterranean clover, English rye-grass, prairie-grass, and lucerne in a mixture. On some wet rich flats showing traces of salt strawberry clover has been tried, but it has not made much headway. As an experiment, an acre and a half has been devoted to sweet clover (*Melilotus alba*), a biennial plant, sown at a rate of 4 lbs. per acre on some badly drained sandy soil. It

furnished satisfactory grazing. A few acres of swedes were grown last year on land heavily dressed with stable manure; they were sown in March on fallow. A yield of up to 35 tons per acre was obtained, and they were fed to the dairy herd.

On this farm careful attention has been paid to building up the fertility of the soil. Apart from the use of peas in the rotation system and the liming of 100 acres with agricultural lime, some 50 acres have been treated with a liberal dressing of stable manure. The horses stabled in Geelong provide 3 tons of manure per week. This is regularly carted to the farm and spread on land being prepared for lucerne or on the pasture, with most beneficial results. Seventy acres of well-ploughed fallow were noticed; 45 acres of this is being utilized for a further planting of lucerne, which ultimately will reach 100 acres. The new field is located near a new dam, made by throwing a concrete wall across a creek. From this storage the lucerne will be irrigated. As weeds are troublesome, lucerne is sown after fallow and in the spring.

A portable loading-race for pigs, in use at Mr. Purnell's farm at Moriac.

A hundred good Comeback ewes with lambs were noticed. Border Leicester rams are preferred.

The dairy herd, so far, consists of seven animals, including four pedigree Jerseys undergoing Government herd test, and one stud-book Jersey bull. The cows graze pasture and the lucerne. The pigs comprise four pedigree York sows and a boar, "Peter Pan," by "Peter Preston" (Baker blood), also four Berkshire sows. An average of about 60 pigs is maintained; these are housed in a row of well-constructed sties open to the east, and giving access to convenient paddocks of grass and lucerne.

Other competitors in the section were Messrs. Leigh Bros. and S. J. Lugg. Messrs. Leigh Bros.' farm, "Roseleigh," consists of 1,539 acres of black, grey, and chocolate stony land on the high volcanic plain in the Anakie district; rainfall 21 inches.

The principal activities are wheat, oaten hay, barley growing, and sheep-raising. The property is well improved, the homestead is an attractive one, and the farm buildings, especially the stable, in which

each horse is fed from a loft above by merely releasing a trap door in a funnel, are well planned. Useful shelter belts of sugar gums and wattles have been planted.

A commendable farming system is practised in which fallow precedes wheat and oats for seed, followed by oaten hay or barley on the stubbles. A feature is the provision for sheep feed on the stubbles following the hay and the barley. These paddocks are disked up in the early autumn, and oats, a bushel and a quarter per acre, sown with 60 lbs. "super."

Rape was tried, but it was not regularly successful; also weeds were sometimes introduced with the seed as obtained from the merchant.

The wheat yields average from five to six bags per acre. Federation is preferred, because it stands up well. Currawa and Yandilla King are also grown.

The sheep seen comprised 500 strong-wooled Comeback ewes of good type and conformation. Messrs. Leigh Bros. showed evidence of

An effective sparrow-trap used on the farm of Messrs. Leigh Bros., Anakie. (A twenty-four hours' catch—75 birds—is seen in the foreground.)

mechanical ingenuity in home-made devices, many of which have been installed about the place. One of these was an efficient sparrow trap near the poultry run; another, a wire in the stable along which the hurricane lamp can be moved from stall to stall; another the feeding device already referred to; and still another the tarred bag-sheeting stack covers noticed.

A feature of the home was the water supply and conveniences for the women folk in the shape of up-to-date washhouse, cool cellar, &c.

Mr. S. J. Lugg, "Iluka," Moolap, was at some disadvantage from a competition point of view in farming a leased property. There are 320 acres of very rich friable black volcanic soil fringing the seashore, 5½ miles on the Portarlington side of Corio Bay. The farm is subdivided into eleven large and five small paddocks. Wheat, oats, barley, and rye are

grown, and a small Border Leicester stud of pedigree sheep is maintained. The bulk of the crop is barley and oats, of which 100 to 150 acres are barley—the major crop—and the balance oats. The general rotation system practised is barley, oats, barley, oats, with an occasional change to wheat or a spell in grass. Little or no fallowing is done, but after the oaten hay is off the land is ploughed as soon as possible and thoroughly cultivated. The combined drill is used to seed the crops.

When the land is spelled in grass, English rye is laid down. Recently it has been shown that Alsike clover grows profusely here. It will be added to the mixture in future.

The soil and climate are ideal for barley, which averages from 18 to 19 bags per acre. The Cape type is preferred, though a little Duckbill and Pryor are usually sown. Duckbill, while not yielding as heavily as Pryor, is found to withstand the heavy "blows" off the coast better than Pryor, which, when ripe, is more easily stripped by the

Border Leicester Sheep at Mr. Lugg's, Moolap.

wind. For barley, a bushel and a half per acre, with 100 lbs. superphosphate, is used. The time of seeding barley preferred is the middle of July. Oats yield on an average seventeen bags, even though often fed off to sheep up till the end of July. May seeding for oats is preferred; a bushel and a half of Algerians is sown with 60 lbs. "super.," gradually increased to 100 lbs. later in the season. Wheat is sown at the rate of a bushel per acre, and rye rather less than 1 bushel.

Success has been obtained with silver beet for sheep feed. In 1919, a paddock, sown in September on a short fallow in rows 2 feet apart, at the rate of two and a half lbs. per acre with 1 cwt. superphosphate, furnished excellent grazing and lasted the full two years. It was ready for the first feeding off in November when 18 inches high. Subsequently it was available for feeding each month.

With the sheep, other than the stud, the general practice is to buy and sell after holding for a short period. Four hundred and fifty sheep were being carried on 45 acres of grass and self-sown Duckbill barley.

Homestead, &c., of Mr. J. J. Baker, Bannockburn, winner in Small Farm Section.

Usually 250 ewes can be lambed down on the grass land, with the aid of grazing furnished by the oat and barley crops. It is found advisable here to feed barley crops, if at all forward, up to the middle of September. The crops seen were very heavy, though showing a trace of carrot weed and a little charlock. Ten acres of oats were exceptionally good. It had been cultivated from twelve to fifteen times, with the object of killing weeds. By contrast with the surrounding crops less thoroughly tilled, it showed the benefit of thorough cultivation on this class of soil.

In eradicating charlock, Mr. Lugg has met with considerable success by ploughing early, then cultivating thoroughly, follow-with a late-sown barley crop.

A point of special interest on this farm was the use of a tractor for the bulk of the ploughing, cultivation, and harvesting operations. With its aid, all but four working horses have been dispensed with. It is stated to suit this particular country very well.

The Border Leicester stud is derived from ewes purchased from Mr. J. Sutherland, Lara, mated with a ram purchased from the Department of Agriculture, Werribee.

Section B.

(Farms less than 100 acres.)

Mr. J. J. Baker's farm, "Rosedale," Bannockburn, is situated on the fertile flats of the Moorabool. It is a striking illustration of what can be done on 91 acres where industry and intelligence are applied to

farming. Mr. Baker specializes in the breeding of pedigree pigs, principally of the Middle York breed. With these he has won a commanding position in the leading agricultural show rings in Victoria and New South Wales. In the 1921 Royal Show, Mr. Baker won with the boar under 15 months, and he bred the champion boar "Rosedale Bubble," and the Reserve Champion boar "Drayton's Chief." The blood of this stud was originally derived on the male side from the boar "Jumbunna Chief," a notable pig owned by Mr. Jenkins, of Korumburra. In all, an average of from eight to twelve breeding sows are kept, giving a total of 30 to 50 stud pigs.

In addition, there is a herd of twenty grade cows with Ayrshire blood predominating. The general practice is to grow 25 acres of English barley (Pryor) for pig feed. The husks of Cape barley are sometimes found to interfere slightly with the breathing of pigs—a disadvantage from a show point of view. The grain is crushed, moistened with boiling water, mixed with skim milk, and fed to the

Drayton's Chief—Two-year-old boar bred by Mr. J. J. Baker.

pigs while it is still warm. Mr. Baker finds that the pigs do better when fed in this way, especially in the winter months.

The young pigs are weaned at eight weeks; they go straight on to the barley and milk. Wheat, maize, and peas have all been tested, and wheat is found very good, and is preferred, if it can be obtained at a reasonable price. Young pigs that scour are allowed out to graze and root; this is found to effect a rapid cure. Mr. Baker remarks, with evident truth, that "earth is pigs' medicine." For market purposes the Berkshire-Yorkshire cross is preferred. The Yorkshires make the best mothers. The progeny are always pure white, and they mature quickly. Here bacon weight is made in six months. Ashes from the boiling copper are placed in each pig pen for health purposes, and lucerne hay is fed to some extent. Barley straw is used for bedding the pigs down, and when incorporated with the urine and dung is carefully preserved in a closely packed heap for future use; when well rotted it is placed on the farm crops.

Up to 20 acres of lucerne are maintained. This crop does well on these flats, despite the low rainfall. An irrigation plant has been installed. With this, water from the Moorabool can be applied in the summer when necessary. The lucerne is now renovated with a spring-tooth cultivator in the early spring, and top-dressed with superphosphate at the rate of 2 cwt. per acre every second year. When the lucerne declines in vigour, a couple of barley crops are taken off before the paddock is re-sown. This is to avoid the effects of lucerne sickness.

From 8 to 10 acres of oats are grown for the working horses. Mangels grow satisfactorily, but it is found that sows fed on them are difficult to get in young.

Forage crops of barley and oats mixed are sown after the first autumn rains for cow feed. The dairy herd graze these crops in the winter, and they have access to the lucerne for short periods, and to some natural pasture on the banks of the Moorabool. Three acres had been sown to peas for marketing while green.

Portion of Mr. Baker's grade dairy herd.

The homestead is a comfortable one, the buildings compact, and the paddocks well subdivided. An attempt was being made by Mr. Baker to erect a fence of home-made concrete posts. The subdivision was convenient, the paddocks being laid off a central lane.

Section C.

(Farms Settled by Soldiers.)

Mr. G. W. Evans' farm consists of 322 acres at Buckley, on portion of the Barwon Leigh station. When taken over in January, 1920, the place was bare of improvements. Now house, stables, bush implement-shed, and extensive pig pens have been erected. A mile and three quarters of subdivisional fences have been put up, two large dams excavated, and sawn-timber sheep yards constructed. The advantages of shade trees have not been overlooked, and a shelter belt of sugar gums has been planted near the house. Due care has been exercised in the construction and lay-out of the various buildings.

The crops sown include 70 acres of oats, 20 acres of barley, 10 acres of dun peas, 12 acres of rape, and 15 acres have been fallowed so far. Portion of the land is suitable for root crops, and may be sown with onions next year. The crops looked well.

Mr. Evans showed considerable resource in turning his barley into profit last year when he was unable to obtain a satisfactory price for it. He erected a series of pig pens of approved construction, purchased suckers and slips, and fed his barley crushed to the pigs, together with a little milk from his solitary dairy cow. The result was that he was able to quit the barley and the pigs at a profit.

The stock on the place consists of five draught horses—in somewhat low condition—and 70 crossbred ewes with lambs. The property has been well developed considering the short time that has elapsed since it was taken over, and the lines on which it is being farmed are sound. If anything, the cereal crops had been sown somewhat on the late side.

A digger's pig-pen of economical construction. (Mr. F. W. Evans', Buckley.)

Mr. L. C. Kelly, who secured second prize, has a well-balanced farm at Anakie, consisting of black volcanic clay soil with a few boulders on the high plain, rich, friable, chocolate soil on the western slopes of Sutherland's Creek, and light sandy lands on the east side. A neat homestead has been erected in a horseshoe bend of the creek in a central and sheltered position. A good start has been made, and a considerable area of stones cleared. The crops seen were exceedingly creditable; they comprised 30 acres of Major wheat, 40 acres of English barley, and 82 acres of oats. The farming system followed is—Fallow, wheat, oats, barley for the high ground; and fallow, oats for the light soil.

Ten bags of wheat per acre were obtained from Major last year, thirteen bags per acre of English barley, and sixteen and a half bags per acre of Algerian oats. The crops look equal to that this year. Pryor is the variety of barley preferred. As yet Mr. Kelly has no sheep.

At Wallington, on 120 acres of the Chevy Estate, sandy loam, with black and chocolate volcanic soils, Mr. B. Maddox, the third competitor in the Soldiers' Section, has taken up a block under the Repatriation scheme. He is dairying, and has got together a herd of thirteen cows, of which nine are in milk. Some 36 acres are sown in crop, including 15 acres of oats for forage, 26 acres of oats for hay, 7 acres of dun peas for grain, 3½ acres of Federation wheat, 12 acres of millet, are to be sown shortly. Near the homestead, the sandy loam is adapted for market gardening. A quarter of an acre of swedes netted £24 last year. A few acres of cabbages and cauliflowers will ultimately be sown.

The place has been well developed in the twenty months it has been settled, and there are convenient improvements, most of which have been erected by Mr. Maddox. Two pigs are kept. The crops were good,

A "digger" at work. (Mr. L. C. Kelly clearing basalt boulders off his land.)

especially the oats and peas, but some trouble is being caused by land infested with weeds such as charlock.

General Comments.

Drainage Problems.

Much of the land south of Geelong, especially in the Moriac district, suffers from excessive moisture in the winter months. Up to the present few farmers have seriously tackled the problem, believing that expensive tile drainage is the only remedy. But certain methods of cultivation have been shown to do much to remedy the evil, and they are comparatively inexpensive. The land should be ploughed with the mould-board plough in lands not exceeding one chain in width, and the same lands should be "crowned" up for several successive ploughings before being alternately split and gathered in the usual manner. The effect of this is to ridge the land up into a series of gentle self-draining undulations. The method has proved a great success on a 100-acre field

at Rutherglen, which suffered badly from waterlogging each year before the work was done. The beneficial effect can be further enhanced by the delving of judiciously placed surface drains, where necessary, to prevent water from adjacent fields entering the cultivation paddocks. If the farmers in the wetter parts of the Geelong district will resolutely attack the problem along these lines, their present troubles will be largely overcome, and at little cost.

Subterranean Clover.

This hardy plant is specially adapted for improving the carrying capacity of land where the quality of the soil and the amount of the rainfall are not sufficient to render profitable the sowing of ordinary English rye grass and clover mixtures. It will usually take possession of areas where the rainfall is as low as from 23 to 26 inches. In some parts it has done satisfactorily on light soils, where the average rainfall is not more than 21 inches. It is able to withstand the dry summer under these conditions because it re-establishes itself each year from seed, and unlike most other annual plants, it is specially equipped with a mechanism which actually plants a large proportion of its seeds in the soil. Experiments by the Agricultural Department, and on private farms, have shown that it will develop wonderfully on the poor light soils at Cavendish. It does well also at Glen Thompson. A test made at Goroke shows that it flourishes on light soils there on a rainfall of 21 inches. The success on "Grassdale," at Moriac, already instanced, is a concrete illustration of its powers of improving the carrying capacity of the soils in that district. The seed is somewhat costly, but success can be obtained from very light seedings per acre if the work is carried out as follows:—

The experience is that it is preferable to use a light seeding of the clover with a cover crop than to sow a heavier quantity by itself. Thus a couple of pounds sown with an oat crop, with 112 lbs. "super.," will usually furnish a better stand than from 4 or 5 lbs. sown by itself, also with manure. A classic instance of this was noted at Grassdale. Similarly a light seeding at Cavendish on the Government experimental plots on the farm of Mr. John Moren made great headway wherever self-sown oats from the year before made its appearance.

The effect of the clover crop is to cause the clover to send out extra long runners, some plants readily attaining a diameter of 2 to 3 feet in a few months. Further, the grass cannot be disturbed by stock till after harvest. If subterranean clover is sown without a cover crop, and cattle placed on it in the spring, the runners are readily pulled up, and the spread of the plant by seed is greatly checked.

Recent tests at Glen Thompson, on the Glen Ronald Estate, at the Government Experimental Field there, have shown that subterranean clover can be established satisfactorily by merely drilling it across the ordinary pasture land, provided the land has been previously top-dressed with superphosphate, and preferably superphosphate and lime.

Subterranean clover was drilled across the 10-acre field of variously top-dressed pastures on the farm of Mr. W. Floyd, Glen Thompson. A luxuriant growth of subterranean clover was obtained only where the land had been top-dressed. The seed did not germinate where there

was no top-dressing. At the present time the pasture presents a remarkable sight. Burr trefoil, slender trefoil, and white Dutch clover were also tested in the same pasture. Of these, slender trefoil was the only one to strike satisfactorily. It behaved precisely like the subterranean clover.

Tillage at Moolap.

The soils on the Moolap flats are rich, black, and friable. They are readily brought into a suitable texture for seeding. Because of that they are often deprived of the cultivation that more refractory soils receive. But some farmers, in eradicating weeds, have been compelled on individual paddocks to till the land unusually well. Mr. S. J. Lugg is one of them. The effect has been to considerably improve the yield of the crop. This should cause others in the district to test the effect of more thorough cultivation, whether weeds require it or not. They will almost certainly find, because of the extra stores of available plant food thus created, that the yields of the crops can be profitably increased. These soils have a similar texture to the Wimmera black soils. The modern Wimmera scarifier—one of the most effective tillage implements and weed killers yet invented—would be invaluable on this class of land. It works well in sticky soils such as these.

Dun Peas.

Hitherto dun peas have been mostly grown on rich volcanic soils, but the marked success of this crop on lighter soils at Geelong should encourage farmers in other districts with similar rainfall to grow this crop more regularly. Besides furnishing satisfactory cash returns, peas are a valuable soil renovator. A remarkable instance of their value in this connexion is to be seen this year on the Government experimental plots on the farm of Geo. Kerr, Strathkellar. Where oats have been sown after peas the crop is considerably better than where no peas were used. Peas, of course, can be grown in fairly dry districts if fallow is used, but judging by tests at the Research Farm, Werribee, the benefit conferred on succeeding crops by the extra nitrogen placed in the soil by the peas does not compensate for the drain on the soil moisture. In wetter districts, however, the advantages of peas in the rotation system are considerable.

Mr. Kerr uses his peas mainly as forage for sheep. They are fed when ripe in January, and are found invaluable for topping-up sheep. When harvested for grain considerable labour is involved; but it is claimed for the modern header that, with simple modification, this will pick up and thresh peas satisfactorily.

PASSION FRUIT CULTIVATION IN VICTORIA.

By J. Farrell, Orchard Supervisor.

Introduction.

The passion vine (*Passiflora edulis*) belongs to the natural order Passifloræ, and the place of its origin is Southern Brazil. There are probably over 200 known species of this order, many of which yield edible fruits, but, because of its being so amenable to commercially successful cultivation in Victoria, *P. edulis* is made the principal variety grown here. America is regarded as the home of most of the species of this order, as some are found in different parts of the United States, including Pennsylvania, Illinois, Florida, also Mexico, Central America, and the West Indies, while others belong to Guiana, Peru, Bolivia, and the La Plata States. From this it will be observed that plants of this genus are naturally favoured by tropical or sub-tropical conditions, as the places mentioned mostly lie between 45 degrees north and 35 degrees south latitude.

Although the primitive home of *P. edulis* is confined mostly to that portion of Brazil which lies between 20 degrees and 30 degrees south latitude, this variety is capable of adapting itself to a comparatively wide range of climatic conditions, and will make good growth, and yield heavy crops of fruit, except where severe frosts occur, when the young wood often becomes badly affected. Individual vines thrive and fruit well in and around Melbourne as well as in most parts of Victoria. The localities of the State, however, where passion fruit is grown commercially, include Wandin, Seville, Silvan, Monbulk, and Mount Dandenong, and the portions of these localities where it is grown have an altitude ranging from about 500 feet to 1,500 feet, and they lie between 37 degrees and 38 degrees south latitude.

Experience has taught that elevations or gentle slopes make the best sites for passion plots, as there is now an ample accumulation of evidence to show that the vines should not be planted in low-lying secluded valleys in which frosts are pocketed.

New South Wales and Queensland also offer a genial home to the passion vine, and it has been cultivated commercially for some years in these States.

History of the Development of Passion Fruit Culture in this State.

To the late Mr. Christopher Thomas Briggs, a pioneer fruit-grower of Wandin, is due the credit of having commenced passion fruit culture on commercial lines in this State. Mr. Briggs began in 1892 by sowing a few seeds which he obtained from the fruit of a plant growing at the residence of Mr. G. E. Overton, a local gardener. The young vines made good growth, and when one year old, about forty were planted out in a row 9 feet apart. The next year the block was increased to half-an-acre, which was extended to 5 acres during the few succeeding years. Mr. Briggs, junior, states each row of vines was supported by a trellis 9 feet high made of posts from rough split timber, with seven 8-gauge

wires, and a continuous line of saplings nailed along the top of the posts. The vines yielded well, and owing to the height of the trellis ladders had to be employed in picking the fruit.

The product of the variety under consideration is at first of a pale green colour, but as its development proceeds the fruit becomes darker until, when fully matured, it is dark purple, and is consequently commonly known among the growers as the " black passion."

At first, Mr. Briggs experienced difficulty in selling his passions, often accepting as low as 4s. per case for them. As the public developed

Fig. 1.—A three-year-old passion vine in its winter condition.

a liking for this class of fruit, however, prices went gradually up to 8s., 10s., 14s., and sometimes £1 per case. Some growers obtained as high as £2 per bushel case for their late crop this year (1922). Certainly this crop was light, but the prices paid indicate the public liking for passion fruit.

Fig. 1 shows a passion vine three years old in its winter condition.

Mr. Briggs' sons also commenced growing the passion, and its cultivation became general in the district, having been taken up by Messrs. Hogg, Johnson, Hunter, Anker, Aitken, Baker, Sebier Brothers, and

others, and later, growers in the neighbouring localities gave it a place in their orchards.

The Government Statist has supplied the following information regarding the quantity of passion fruit grown in Australia during the last few years:—

Year.	Victoria.	New South Wales.	Queensland.	Total.
	Bushels.	Bushels.	Bushels.	Bushels.
1918–19 ..	10,447	49,049	5,553	65,049
1919-20 ..	17,635	58,901	3,707	80,243
1920-21 ..	10,775	24,819	10,375	45,969

The estimate for 1921-22 for Victoria is 16,759 bushels. It may be interesting to know that in 1918-19 6,840 bushels of passion fruit were produced in Norfolk Island. No later figures for that place are available.

Because of the ever increasing demand for passion fruit, the area under vines in the districts which have proved suitable for their cultivation is being considerably extended. There are also many new blocks of land being planted this year, and growers are looking forward to the still further successful cultivation of this fruit.

Up to the present the local markets have been capable of absorbing all the fruit produced here, but in consequence of the rapid extension of the areas under cultivation, it has been deemed desirable to make provision for sending a possible future surplus to oversea markets. With this object in view the Department of Agriculture is conducting a series of cool storage and other experiments to prevent the usual wilting of the fresh fruit, so that it may export satisfactorily. A firm in Melbourne has commenced "processing," and in this way some of the surplus, and most of the fruit affected by the fungus (*Gloeosporium*) may be utilized. Experiments are also being carried out in the fruit-growing centres to further test the relative efficacy of the different fungicides against this disease.

I.—Situation and Climatic Condition.

The passion vine's aversion to cold climatic conditions is now well known, and it is a matter of paramount importance that, when selecting a situation for the passion plot, this aspect of the question should receive the first consideration. Light frosts do this vine little or no damage, but fairly heavy ones affect it badly. It thrives and fruits best in a warm, humid atmosphere such as that obtaining in the sub-tropical country of its origin. It is obvious, therefore, that when planting in this country, conditions similar to those should be sought. It is unfortunate, however, that the climatic conditions which favour the growth of the vine are even more favorable to the development of the wood, leaf, and fruit fungus which attacks it, but, as previously stated, measures are being taken to cope with this disease.

The passion vine is an evergreen, and makes a little growth during mild winters, and occasionally growers find to their cost that it should not be planted in cold, low-lying situations, especially between hills, where it is most likely to be attacked by winter frost, the effect of which

is more severe on plants which suffered from *Gloeosporium* during the previous late summer and autumn than it is on healthy ones.

In hilly country the site for the vine plot should preferably occupy an elevated part with a gradual slope to the north or north-east, and plants do well on the north-west slope, provided the site be nicely sheltered. Southerly slopes are mostly avoided, but even on these, if not too abrupt and suitably sheltered, good crops are sometimes harvested. Passions like shelter, and are not averse to a reasonable amount of air circulation, but they abhor wind-swept positions, and particularly during winter. No hard and fast rule can be laid down in this regard, but intending planters should give the matter the consideration it deserves, and to determine the needs of individual cases. In these undulating localities sufficient shelter is sometimes afforded by the lie of the land, as adjacent hills often intercept prevailing winds. Then in grubbing the site for the passion plots belts of native timber are allowed to remain as shelters. Where these natural advantages are absent, however, break-winds of *Pinus insignis*, gums, or other suitable trees, are employed.

II.—Soils.

In the case of the other fruits both large and small, we have an extensive knowledge of their likes and dislikes for the different classes of soils; with the passion, however, our knowledge of its requirements in this regard is limited. This is because of its comparatively recent introduction to the ranks of commercial fruits here, but evidence of its requirements as regards both climate and soils is rapidly accumulating. Up to the present, the fairly rich, red friable soils of Wandin, Seville, Silvan, Monbulk, and Mount Dandenong seem to have come nearest to the liking of this plant. It also grows well at Welshpool and Yarram, in Gippsland, and experiments are being made to test its appreciation of the rich siltations at Bacchus Marsh, the black volcanic soil of the Red Cross Farm, at Janefield, also those in other parts of the State.

Two well-developed passion fruits about four-fifths natural size are shown in Fig. 2, A and B; (*c*) and (*e*) are cross sections of A; while (*d*) and (*f*) are longitudinal sections of B. These fruits, although of a late crop, were of good quality and well "filled."

The soils of the districts in which passions are grown commercially here are deep, friable, and fairly rich, but are of a rather porous, loose, or open construction, and are, therefore, liable to dry up quickly. These districts being hilly, however, have a fairly heavy rainfall, and sufficient capillary moisture for the use of the vines is maintained by intensive and continuous cultural treatment of the soil during warm weather.

There seems to be no reason why the northern irrigation areas should not be suitable for passion fruit culture, but sufficiently extensive experiments have not yet been carried out to settle the question.

Individual vines thrive and crop well in many of the private gardens on the lighter grey soils around Ringwood, Bayswater, and several other places, and one is forced to conclude that this plant is more particular concerning climate than it is in regard to its choice of soil.

As well as differing vastly in construction and texture, the relative quantities of the different elements of plant food in the red soil mentioned vary considerably from those of the lighter soil of Ringwood,

Tunstall, &c. Samples of both soils were sent to Mr. P. Rankin Scott, Chemist of Agriculture, for analysis. Hereunder is a copy of Mr. Scott's report. Samples Nos. 1 and 2 are surface soil and subsoil from Monbulk, Nos. 3 and 4 are corresponding samples of the light soil from Tunstall:—

Nos. 1 and 2 from Monbulk.
Nos. 3 and 4 from Tunstall.

The samples, on analysis, were found to contain—

	Parts per 100,000.			
	I.	II.	III.	IV.
Nitrogen	212	187	117	58
Phosphoric acid	96	80	32	25
Potash	123	98	67	98
Lime	116	44	40	30
Magnesia	116	74	92	136
Chlorine	8	8	4	4
Reaction	Slightly acid.			Acid.

The red soils, notwithstanding their relatively high content of plant food, as shown by the analysis, are not as suitable for apple and pear growing as the lighter soils, but small fruits do well on them. The object of giving the analysis here, however, is to show the different conditions under which the passion seems to thrive.

III.—Raising Young Plants.

Young vines are raised from seeds, which should be saved from fruit ripening from April to June, as these give a higher percentage of germination and strong plants than those ripening at any other time. The need for careful bud, scion, and seed selection when propagating other fruit trees is now generally recognised, and it is desirable also when establishing a passion fruit garden that this principle should be observed. The seeds for propagation purposes should be taken from the large fruits of vigorous healthy plants known to be precocious and prolific bearers. These fruits should not be picked until fully matured, then allowed to wilt and dry naturally, and afterwards kept in a dry cool place until the seeds are required for sowing. The seeds may be sown in drills in beds or boxes from the end of September until the beginning of November, according to weather conditions prevailing locally. The best plants are those grown in the open, the earlier the seed is sown the better, and the young vines may be protected from late frosts with the boughs of trees, with hessian or other suitable material. Before sowing the seed the soil should be brought to a fine state of tilth, and the seeds may be covered with an inch of fine earth. The seeds soon germinate, and the young plants appear above the ground, and if the soil be kept free from weeds and nicely watered during the summer the result is usually what is desired.

Seedlings are depicted in Fig. 3. A gives section of a bed, and B shows them growing in a drill. Those in the bed made the better growth, the seed having been sown earlier than that for those in the drill, and on account of having received more attention than the latter during the main period of growth. The writer would recommend the drill system, because the soil between the drills can be kept cultivated and the stems and lower parts of the plants would get more light and

air than those grown in beds. The seedlings should not be allowed to grow too thickly, and the weak, useless ones should be weeded out so as

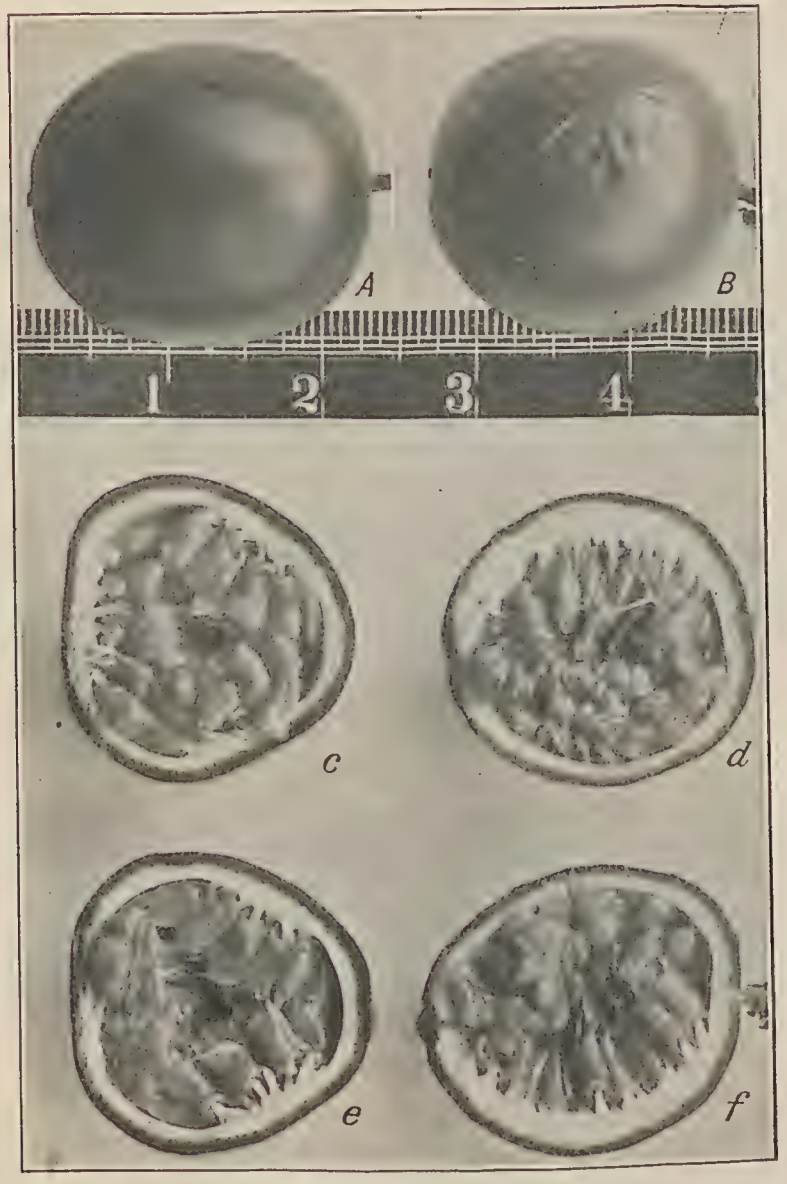


Fig. 2.—Two passion fruits, A and B.
c and e are cross-sections of A.
d and f are longitudinal sections of B.

to give the good plants sufficient room. The best results are obtained when the seedlings are allowed a reasonable amount of space—about

6 inches apart, and while growing in the nursery their stems should be kept single, without side shoots, to a height of from 4 to 6 inches above the soil level.

The matter of producing young vines is a comparatively simple one, and growers should raise those required for their own use. Then, when establishing or extending the plot, the young vines are on the spot, and it is only a matter of carefully lifting out each one with a spade, keeping its soil and roots intact, and placing it in its permanent position. When planting takes place under these conditions, the results are much more

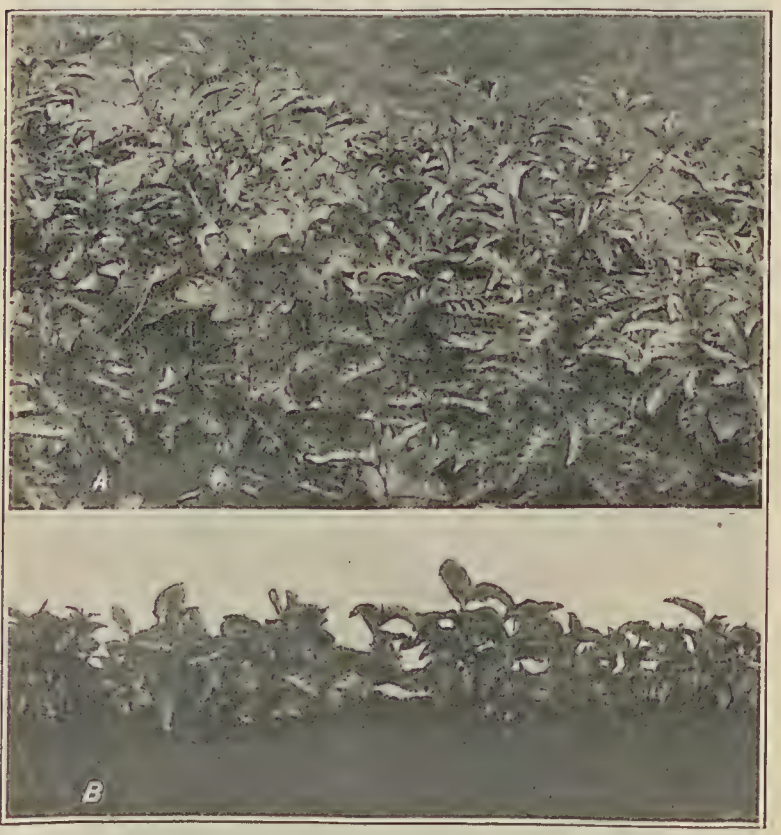


Fig. 3.—Seedlings growing—A, in a bed; B, in a drill.

satisfactory than when the foliage branches and roots of the young vines are crushed and broken in transit from one place to another. Seedlings raised under glass or forced with heat are not recommended, as they are usually of a yellowish colour, delicate, and rarely grow into as strong and profitable vines as those raised in the manner explained. In order to obviate injury to plants in transit, seedlings are sometimes grown in pots and forwarded in them to growers, but potted plants are also inferior to those grown in the open.

(To be continued.)

NATIONAL MUSEUM MELBOURNE

Grow More Summer Fodder!

A Splendid Crop of Sudan Grass

Extract from "Argus," 24/10/22. **FODDER SHORTAGE LIKELY.**—Fearing a shortage of fodder the Water Commission is advising settlers in the irrigation areas, particularly those who specialize in fodder growing, to increase their production as far as possible this year. The shortage is expected throughout Australia owing to dry conditions. The Chairman of the Commission (Mr. Cattanach) said yesterday that, apart from increased returns, he thought that settlers by increasing their acreage would be performing a national service. The Commission had already circularized its officers to this effect, and every effort would be made to induce growers to provide reserves of fodder.

SOMNER'S High-Grade, Tested, Re-Machine Cleaned SEEDS

Give Best Results

SUDAN GRASS

Special Imported American Re-Cleaned Seed, 6d. lb.; 50/- cwt.
Colonial, 5d. lb.; 40/- cwt.

MAIZE

Re-Machine Cleaned and Graded.

Craig Mitchell Mammoth White, 9/- bus. ***Hickory King, Funk's Yellow Dent, Sibley, Early Leaming, Red Hogan, Victorian 90-Day,*** 8/- bushel. ***Victorian Flat Red,*** 6/6 bushel.

LUCERNE

Hunter River (True N.S.W. Grown) 3/6 lb.; 3/3 lb. in cwt. lots; 3/- lb. in 300 lb. lots.
New Zealand (Celebrated Marlborough Strain), 2/8 lb.; 2/7 lb. in cwt. lots or more.
French Provence, 2/9 lb.; 2/8 lb. in cwt. lots or more.

JAPANESE MILLET

Extra Quality Re-Machine Cleaned, 4d. lb.; 32/8 cwt. (We can also supply Prime Farmers' Dressed Seed, 4d. lb.; 28/- cwt.).

LAW, SOMNER Pty. Ltd.

Established over 72 Years

Seed Merchants and Nurserymen
Block Place & Swanston St., Melbourne

The leading Agricultural Seed House in Victoria

DEPARTMENT OF AGRICULTURE, VICTORIA

Red Poll Dairy Herd

The Department will shortly have completed the orders for calves that were booked ahead of calving when the advertisement was withdrawn; consequently the booking of orders for bull calves from the forthcoming calvings has now been resumed.

BULL CALVES are sold for delivery at a month old at prices based approximately on the actual milk and butter fat record of the dam at the rate of 1s. per lb. of butter ***fat*** yielded.

(For Record of Yields of dams see Red Poll Herd Book.)

The Bulls in Use include—

LONGFORD MAJOR (Imported)

Dam's Record 14713 lbs. milk ... 6 years average 11338 lbs. milk
G. Dam's ,, 10548 ,, ... 4 ,, ,, 9135 ,,

BELLIGERENT (Imported)

Dam's Record (1st milking) 7144 lbs. milk.

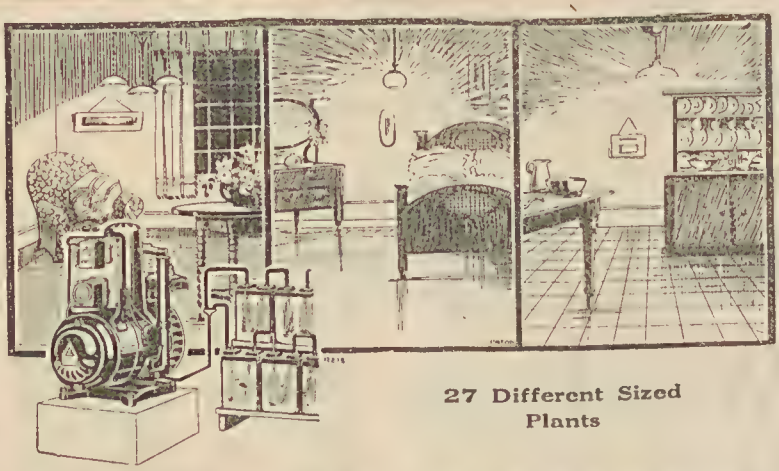
Dam's Dam's	,,	14533 lbs. milk	...	4 years average	12871 lbs. milk
Sire's Dam's	,,	10370	,,	...	7	,,	,,	9354	,,
Sire's D. Dam's	,,	9510	,,	...	12	,,	,,	8033	,,
G. Sire's D. Dam's	,,	10215	,,	...	7	,,	,,	9386	,,
G.G. Sire's D. Dam's	,,	12565	,,	...	10	,,	,,	8853	,,
G.G.G. Sire's D. Dam's	,,	10088	,,	...	2	,,	,,	9754	,,

Inspection of the Herd is Invited.

Visitors will be met at the Station on notifying the Manager, State Research Farm, Werribee.

Application for purchase to

Dr. S. S. CAMERON, DIRECTOR OF AGRICULTURE, MELBOURNE.



27 Different Sized Plants

DELCO-LIGHT

Will give you instant Electric Light in your home or on your farm

ONE of the great comforts and conveniences of city life is the Electric light and power. Yet you can have Electric light and power in your own home if you instal Delco-Light. With a Delco-Light you can light every room in your house and all barns and outhouses. But more, you can have power enough to drive all the small machines that are at present hand-driven—such as churns, separators, moto milking machines, grindstone, electric fan, iron vacuum cleaner, &c., &c.

This means all the comfort of the city no matter where you live

Write now for particulars to

WARBURTON FRANKI (MELB.) LTD.

380 Bourke Street

SEND FOR CATALOGUE "J.A."

A Powerful Water Raiser for the Farm ——

The "BILLABONG" Windmill

is specially designed to suit Australian conditions. It is a leader of its class—smooth and easy running—substantial in construction—and a quality mill through and through.

A special feature of the "BILLABONG" Windmill is the patented Speed Regulator and Governor that will not allow the wheel to "race" in heavy winds, while the bearings are so accurately aligned that the lightest breeze is converted to useful power. It is a usual sight to see the "BILLABONG" working when others are idle.

When fitted with the Automatic Tank Supply Regulator, the "BILLABONG" stops or starts according to the level of the water in the tank. There is no fear of stock being left unwatered, or of any wastage occurring by overflow from the tank.

If you are looking for REAL Windmill Service, write NOW for our illustrated Booklet "S 65," which is free for the asking.

JOHN DANKS & SON PTY. LTD.

DANKS

391-403 BOURKE ST. MELB.

and at 324-330 Pitt St., Sydney

PARSONS BROS. & CO.

—Propy. Ltd.—

OATMEAL, SPLIT PEAS, and
PEARL BARLEY MILLERS
and "CORNINA" MANUFACTURERS

—ARE—

BUYERS of OATS, PEAS, BARLEY, and MAIZE.

SEND SAMPLES OF YOUR GRAIN TO US.

BOX 2514,
G.P.O., MELBOURNE.

THE STATE SAVINGS BANK
CREDIT FONCIER

Loans on Farms

Up to two-thirds of valuation in sums from £50 to £2,000, repayable by instalments spread over a period of 27½ years. Interest 6 per cent. per annum.

Special Terms for Discharged Soldiers and Dependants, also those who were in **Red Cross** and **Transport Services,** up to three-fourths of valuation, repayable by instalments spread over a period of 30¼ years. Interest 5¾ per cent.

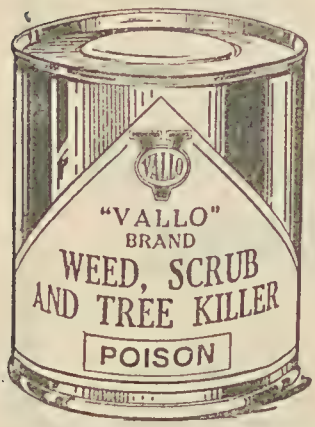
NO CHARGE FOR MORTGAGE DEED

Application forms obtainable at any Branch of the State Savings Bank.

State Savings Bank,
Head Office—Elizabeth Street, Melbourne

GEO. E. EMERY,
Inspector-General

TREES and SCRUB
ST. JOHN'S WORT
THISTLES BRIARS
BLACKBERRIES
BOXTHORN
COUCH FERNS
FURZE SORREL



NOXIOUS WEEDS

Every square foot of ground is valuable now-a-days—far too valuable to be usurped by undesirable weeds and scrub. Why should they sap the vitality out of ground which should contribute to your storehouse or granary?

"VALLO" Brand Weed Scrub and Tree Killer

Is the speedy, sure, and economical means of cutting short their existence. "VALLO" is not an experiment. It is an absolute exterminator of any and every kind of noxious growth. Whether your trouble be giant trees or common sorrel, put "VALLO" on the job and you'll be impressed by what it can do.

PRICES—56 lbs., 70/-; 15 lbs., 21/3; 7 lbs., 10/6; 1 lb., 2/-; ½ lb., 1/3

Manufactured by

A. VICTOR LEGGO & CO.

Melbourne — Sydney — Brisbane

FOR TOP PRICES —— CONSIGN YOUR

Wool, Grain, Produce, Fat Stock

—— TO ——

AUSTRALIAN, MERCANTILE,

Land and Finance Company Limited

MELBOURNE

Sales of Sheep and Cattle held Weekly at Newmarket

THE

Farmers & Settlers' Co-Operative Insurance Co.

OF AUSTRALIA LIMITED

The only Co-Operative Fire Insurance Company in Victoria Owned and Controlled directly by the Farmers and Graziers

OVER 6,000 FARMERS AND GRAZIERS ARE SHAREHOLDERS IN THE FARMERS AND SETTLERS

You can only share directly in the Profits of an Insurance Company when you are a Shareholder

The Farmers and Settlers is Supported by different Co-Operative Trading Companies in Australia, representing 75,000 Shareholders

Over £13,000 has been distributed in Dividends to Farmers and Graziers in the past few Years

FARMERS AND GRAZIERS, SUPPORT THIS COMPANY WITH ALL YOUR INSURANCES, WHEN DIVIDENDS AND BONUSES TO YOURSELVES WILL BE INCREASED CONSIDERABLY

Full Particulars from any Agency of the Victorian Producers' Company, or H. L. CARROLL, Manager, 360 COLLINS ST., MELBOURNE.

DAIRY UTENSILS

SEAMLESS AND RIVETLESS

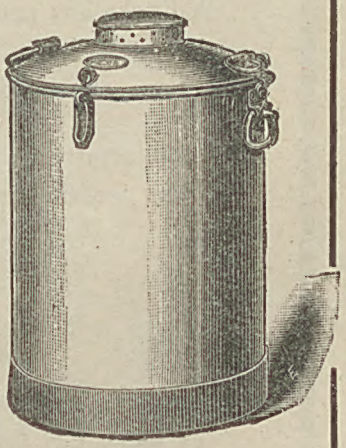
'Phone Central 4386, 4387, 4388

A. JOYCE & CO.

PTY. LTD.

587 to 595 Elizabeth Street
MELBOURNE

CHEESE VATS, CREAM MAKING VATS,
MILK VATS, BUTTER FACTORIES' REQUISITES,
MILK COOLERS, TANKS, DAIRY HEATERS



SEAMLESS STEEL CREAM CAN

The Largest Manufacturers of Dairy Utensils in the Commonwealth

Adamo
WALL BOARD

The ideal lining board for walls and ceilings.

Very tough and rigid—is not brittle; can be transported long distances without breaking, and easily sawn.

Easily fixed in position—one man can, with ease, handle a sheet 10 ft. x 4 ft.

Readily nailed without cracking, and is a non-conductor of heat and cold; also fire-retardent. It deadens sound.

A resistant of white ants and other pests. Rats and mice do not attack it.

Very light, being 6¼ lbs. to the square yard, and does not bulge or warp with sea air or mountain mist.

Will take any paint and also Wall-paper. In short, the most artistic Wall Board, suitable for ceilings, partitions, or wall-panelling for inside work.

Manufactured in Australia by Australians from Australian wood pulp.

Particulars from

WILLIAM ADAMS & CO. LTD.

521 COLLINS STREET, MELBOURNE

and Sydney, Brisbane, Newcastle, Adelaide, Perth, and Launceston

By Authority: Albert J. Mullett, Government Printer, Melbourne.

for Harvesting—

CASE

Kerosene Farm and General Purpose Tractor

for harvesting, the CASE is supreme, being dust-proof and fire-proof. In fact, the CASE is the most reliable Tractor for every farming operation usually performed by horses.

The CASE cannot cause a fire.

CASE

"The Tractor that Knows no Rival"

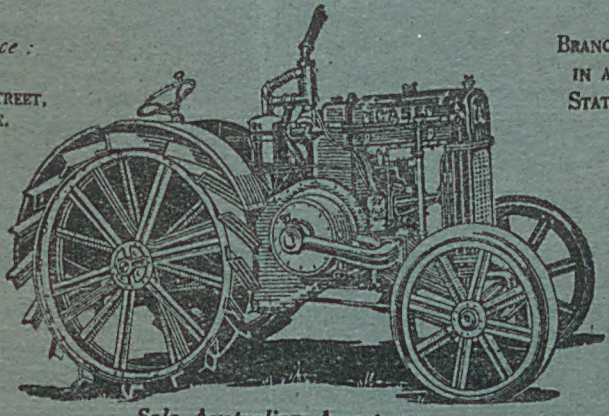
All vital parts are dust-proof.

is made by a concern with eighty years' experience in the manufacture of high-grade farming machinery, and is a proved success. The CASE in Australia is supported by an Engineering Service with every facility for the prompt furnishing of spare parts and the immediate execution of urgent repairs. Furthermore, for twelve months after the purchase of a CASE, the buyer is entitled to a liberal service of our expert engineers—without cost to himself. The CASE Tractor is constructed to more exact standards than any other tractor on the market, and will do for you what no other can.

Let us prove these statements to you.
Special terms of purchase may be arranged.

Head Office :
53-57
MORPHETT STREET,
ADELAIDE.

BRANCHES IN ALL STATES.



Sole Australian Agents :

Commonwealth Agricultural Service Engineers Ltd.

Victorian Branch:

Clarke Buildings, 430 Bourke St., Melbourne

C.19.

VICTORIAN RAILWAYS

PICTURESQUE VICTORIA

SUMMER EXCURSIONS

The Victorian Railways issue **Tourist Tickets** to the Seaside, Mountains, Rivers, Lakes, and Caves, **from 15th October till 30th April**

MOUNT BUFFALO

Excursion Fares all the year round

First-Class Combination

Week Tickets

covering Transport and Accommodation, at "The Government Chalet," are issued on Mondays, Tuesdays, and Thursdays, by the 6.30 a.m. train, and on Fridays by the 4 p.m. Express train, at **£8 16/-** plus 12/6 extra if Excursionists are conveyed by Motor from Bright or Porepunkah.

Special Week Tour Tickets

all including Accommodation, Transport, Outings, &c.

HEALESVILLE	£4
WARBURTON	£3/15/-
COWES	£5/10/-
MOUNT BUFFALO	

See other side.

Write to the Government Tourist Bureau for full particulars.

Victorian Government Tourist Bureau

Queen's Walk, Opposite Town Hall, Melbourne

Full Information supplied in regard to **Excursions, Tourist Resorts, Accommodation, &c.** **Tickets issued daily**

Handbooks, Maps, and Hotel Guides Free on application.

Telephone Nos. 2898 and 2899 Central

GEO. H. SUTTON,
Secretary for Railways.

SP
63-5
V645